DOCUMENT RESUME

ED 107 908 CE 004 021

TITLE Vocational Carpentry Curriculum Guide.
INSTITUTION Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Education.; Virginia State Dept. of Education, Richmond. Div. of Vocational Education.
PUB DATE Apr 73
NOTE 130p.

EDRS PRICE MF-$0.76 HC-$6.97 PLUS POSTAGE
DESCRIPTORS Building Trades; *Carpenters; Construction (Process); Course Content; Course Objectives; *Curriculum Guides; Hand Tools; *Resource Materials; Resource Units; *Secondary Education; Teacher Developed Materials; *Vocational Education
IDENTIFIERS *Carpentry

ABSTRACT

The carpentry curriculum guide was developed as a basic guide to be used by instructors in formulating their own courses of study. The material is designed for use in vocational carpentry classes at grade levels 10, 11, and 12. Planned as a two-year sequence, it incorporates 1080 class hours of instruction and emphasizes light or residential type construction. A statement on vocational education philosophy, an outline of objectives, a job description, and a suggested block time schedule are followed by 11 blocks of instruction: orientation, hand and portable power tools, foundation and forms, floor and wall framing, roof framing, roof covering, exterior wall finishes and trim, insulation and interior wall and ceiling finishes, interior trim, stair building, and pre-employment. Instructional blocks are organized under the headings of units of instruction, information, skill-development activities, and instructional aids. Appendixes (which provide unit guide examples for block two; lists of suggested films, filmstrips, slides, transparencies, film loops, books, construction illustrations; pamphlets, handout material, and wall charts; safety rules; and a suggested tool list) comprise nearly two-thirds of the guide. (JR)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED107908

MAR 19 1975

Vocational Carpentry Curriculum Guide

TRADE AND INDUSTRIAL EDUCATION
ADULT SUPPLEMENTARY • HEALTH OCCUPATIONS • TRADE PREPARATORY • TECHNICAL
INDUSTRIAL COOPERATIVE TRAINING •
VIRGINIA

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Trade and Industrial Education Service
Division of Vocational Education
State Department of Education
Richmond, Virginia 23216
in cooperation with
The Department of Education
Virginia Polytechnic Institute and State University
Blacksburg, Virginia 24061
April 1973

CE004021

FORWORD

Instructors in the building trades area have possibly been in need of curriculum materials more than most instructors in Trade and Industrial Education. We are particularly happy, therefore, to have this Carpentry Course Outline ready for distribution.

With the constant introduction of new building methods and new construction materials, the carpenter's work becomes more complicated and the necessity for keeping abreast of these new developments is quite essential. It is hoped that this carpentry outline will assist the teacher in keeping his instructional program updated and relevant to the times.

We express appreciation to the teachers and the Virginia Polytechnic Institute and State University Staff who assisted with this outline. They are listed on the following page. We feel that they have done an excellent job in getting together in outline form the essential operations and related information that must be learned for successful employment entry into the carpentry trade.

George W. Swartz
State Supervisor
Trade and Industrial Education
State Department of Education
Richmond, Virginia 23216

April 1973

PREFACE

This Carpentry Curriculum Guide has been developed for the use of instructors in Vocational Trade classes. Emphasis has been placed on light or residential type construction so as to meet the objectives of the public secondary school carpentry curriculum.

This suggested curriculum guide is presented as a basic guide to be used by instructors in formulating their own courses of study. The material is designed for use in Vocational Carpentry classes at the tenth, eleventh, and twelfth grade levels. It is planned as a two year sequence, incorporating 1080 class hours of instruction.

This guide was developed by a group of carpentry instructors who were participating in a curriculum development workshop at Virginia Polytechnic Institute and State University in the summer of 1972. Those participating are listed below:

Instructors:

Bandy, Robert D.; Lucy Addison High School, Roanoke
Chizanskos, Joseph C.; Piedmont Vocational School, Culpeper
Davis, Vernon P.; Bedford Educational Center, Bedford
Hankins, George E.; Tazewell County Vocational Center, Tazewell
Hudson, Paul.; Wythe County Vocational School, Wytheville
Hurst, Douglas Wayne; Carroll County High School, Hillsville
Moye, Everett L.; Giles County Vocational School, Pearisburg
Parks, Garland Raymond; (Student)
Phibbs, Arby H.; Pulaski High School, Pulaski
Richey, Leroy C.; Chesapeake Technical Center, Chesapeake
Thomson, George M.; Floyd County High School, Floyd
Washington, William C.; Brunswick Jr. High School, Lawrenceville
Worthen, Darrell F.; Henrico Trade Training Center, Glen Allen

Curriculum Development Coordinator:

William H. Hines

Lester G. Duenk
Head Vocational Industril Education
Virginia Polytechnic Institute
and State University
Blacksburg, Virginia

TABLE OF CONTENTS

FOREWORD i

PREFACE ii

ACKNOWLEDGEMENTS iii

CARPENTRY 1

Philosophy 1

Objectives 1

Job Description 2

Block Time Schedule 3

Suggested Units of Instruction 5

Block 1 Orientation 7

Block 2 Hand and Portable Power Tools 11

Block 3 Foundation and Forms 15

Block 4 Floor and Wall Framing 19

Block 5 Roof Framing 21

Block 6 Roof Covering 29

Block 7 Exterior Wall Finishes and Trim 33

Block 8 Insulation, Interior Wall and Ceiling Finishes . . . 37

Block 9 Interior Trim 41

Block 10 Stair Building 47

Block 11 Pre-employment 51

APPENDIXES 55

Appendix A - Unit Guide Examples - Block 2 57

Appendix B - Books and Visual Material 89

"A" Films 91

"B" Filmstrips and Slides 95

"C" Transparencies 96

"D" Film Loops 96

TABLE OF CONTENTS

Appendix B - Books and Visual Material (continued)

"E" Books 97

"F" Flip Charts 101

"G" Workbooks 101

"H" Pamphlets 101

"I" Handout Material 103

"J" Wall Charts 139

Appendix C - Suggested Tool List 141

CARPENTRY

Philosophy:

Believing that the individual student is the heart of an educational program, we are dedicated to the preparation of the student to live a successful life in a changing world and to the advancement of the concepts of democracy which preserve and improve our culture.

We are aware of society's need for productive, well adjusted, creative citizens and strive to provide the atmosphere and stimulation needed for problem solving skills in all areas of human endeavor.

We believe that vocational education should provide broad, adequate training to prepare the student for entrance-level employment. We recognize the worth of each individual and believe that his training should be limited only by his interest and his ability.

Objectives:

1. To develope safe work habits.

2. To acquire knowledge and skill in interpreting and using blueprints and specifications.

3. To gain sufficient knowledge in the use of mathmatics to solve problems applicable to carpentry.

4. To acquire the knowledge and skill in building layout, footings and foundations.

5. To be able to construct concrete forms.

6. To gain the knowledge and skills to erect the sub-floor system, exterior walls, interior walls, and roof.

7. To acquire the knowledge of and skill in exterior and interior finish work.

8. To develop an appreciation for habitual cleanliness, neatness, and orderliness in his work and personal life.

9. To develop self-confidence in acquired knowledge and skills of the trade and to understand the occupational opportunities available to a good craftsman.

10. To develop an attitude of cooperation toward other craftsmen.

CARPENTRY
Job Description

The carpenter constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard, using carpenter's hand and power tools, to conform to local building codes.

Studies blueprints, sketches, or building plans to determine the type of materials, construction and measurements required.

Prepares layouts using rule, framing square and calipers.

Marks cutting and assembly lines on materials using pencil, chalk and marking gauge.

Shapes materials to prescribed measurements and shapes using saws, chisels, and planes; assembles cut and shaped materials and fastens them together with nails, dowel pins or glue.

Erects framework of structures and verifies trueness of structure.

Lays subflooring, covers subflooring with building paper, lays hardwood, parquet and wood strip flooring by nailing to subfloor or cementing to mastic or asphalt base.

Builds stairs; lays out and installs partitions and cabinet work. Applies paneling to walls and ceiling. Fits and installs prefabricated window frames, doors, door-frames, weather stripping, interior and exterior trim and finish hardware.

Constructs concrete forms and pouring chutes. Erects scaffolding and ladders for assemblying structure above ground level.

The work of the carpenter is active and sometimes strenuous but exceptional physical strength is not required. Prolonged standing as well as climbing and squatting is often necessary. Good physical condition, a good sense of balance and manual dexterity are important.

The carpenter works both inside and outside in heat and cold and is subject to extreme temperature change. The work may be performed under wet or humid conditions. Job condition may be noisy.

Carpenters risk injury from slips and falls; from contact with sharp or rough material and from the use of sharp tools and power equipment.

BLOCK TIME SCHEDULE (Suggested)

Block	Hours
1. Orientation	12
2. Hand and Portable Power Tools	33
3. Foundations and Forms	85
4. Floor and Wall Framing	225
5. Roof Framing	194
6. Roof Covering	95
7. Exterior Wall Finishes and Trim	73
8. Insulation, Interior Wall and Ceiling Finishes	70
9. Interior Trim	165
10. Stair Building	125
11. Pre-employment	3
Total Hours	1080

SUGGESTED UNITS, INFORMATION, ACTIVITIES, AND REFERENCES FOR CARPENTRY

(INDEX CODE FOR REFERENCES AND INSTRUCTIONAL AIDS WILL BE FOUND IN THE APPENDIX)

ORIENTATION

BLOCK ONE

A. School and Class Rules

B. Stop and School Safety

C. Shop Organization

D. Purpose of the Course

E. Description of the Carpentry Trade

ORIENTATION: Block No. 1

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
A. School and Class Rules	Relate the general rules to class	Entertain class questions and discussion	A-8 A-10 E-1
B. Shop and School Safety Rules	Lecture Emphasize the utmost importance of safety in the following areas: a. Personal safety 1. Clothes 2. Glasses 3. Hair 4. Personal cleanliness	Entertain class questions and discussion	A-9 A-10 B-5 E-1 H-4
	b. Shop safety concerning the following: 1. Horseplay 2. Housekeeping 3. Mechanical equipment 4. Ladders 5. Scaffolds 6. Electricity 7. Lifting 8. Fire extinguishers	Class participation in demonstration of safety practices	
C. Shop Organization	Explain how and why the shop is organized	Study organizational chart and duties of class members	A-9 A-11 E-1
D. Purpose of Course	Lecture Emphasize the importance of and need for carpenters in our society and explain the following: a. Carpentry class philosophy b. Course objectives c. Brief description of blocks of study	Class discussion	E-18 A-6 E-1

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPEMENT ACTIVITIES	INSTRUCTIONAL AIDS
E. Description of Trade	Lecture Discuss the advantages and disadvantages of carpentry as a vocation a. Working conditions b. Divisions of carpentry and areas of specialization c. Job opportunities d. Physical requirements e. Work and social habits	Class discussion and questions	E-18 A-6

HAND AND PORTABLE POWER TOOLS

BLOCK TWO

A. Hand Tools

B. Portable Power Tools

C. Hand and Power Tool Safety

Block No. 2

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
A. Hand Tools	Lecture and Demonstration Explain the care and use of the tools in the following classes, so the student will be able to choose the right tool for the job and use it correctly. Emphasize safety in the use of each tool. a. Measuring and layout tools b. Saws c. Planes and edge cutting tools d. Drilling and boring tools e. Fastening tools f. Disassembly tools g. Miscellaneous tools	Class discussion and student demonstration of care and use of tools Identification of tools and parts	A-11 A-13 A-27 E-1 E-5 E-26 E-40
B. Portable Power Tools	Lecture and Demonstration Explain the correct care and use of each power tool and emphsize the safety hazards inherent in each: a. Electric power hand saw b. Sabre saw and reciprocating saw c. Radial saw d. Electric planes e. Electric drills f. Power nailer	Class discussion and student demonstration of use of each tool.	A-11 A-13 A-27 A-30 E-1 E-5 E-26 E-40

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
B. Portable Power Tools (continued)	Lecture and Demonstration (continued) g. Belt and finishing sanders h. Grinder i. Router		
C. Hand and Power Tool Safety	Lecture Review briefly safety in the use of these specific tools and explain the general safety rules that apply to all hand and power tools.	Class discussion and review Class practices safe use of tools	A-11 A-13 A-27 A-30 E-1 E-5 E-26 E-40

FOUNDATION AND FORMS

BLOCK THREE

A. Plot

B. Building Layout

C. Footing

D. Foundation Walls

E. Forms

Block No. 3

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
A. Plot	Lecture Explain the importance of the plot plan. Give information that is generally found on plot plan and explain how to interpret it. Relate information concerning the following: a. City or county requirements b. Reference points c. Finish elevation d. Contour lines e. Scale used on plot plan.	Take notes and study plot plans and elevations.	B-1 B-2 C-8 E-21 E-29
B. Building Layout	Lecture Explain the importance of building layout and the method and need for location of available utility lines and underground pipes and cables.	Take notes and read related information.	A-1 B-1 B-2 C-8 E-5 E-29 E-38
	Present the following methods for squaring a building layout: a. Builders transit level b. Diagonal method c. 6,8,10 method	Practice leveling transit and calculate degrees Sharpen stakes Practice using tapes and lines	
	Demonstrate Erection of batter board stakes and methods of finding their proper elevations.	Construct batter boards	

FOUNDATION AND FORMS: (continued) Block No. 3

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
C. Footings	Lecture and Demonstration Explain and emphasize importance of: a. Purpose of footings b. Conditions affecting size of footings c. The use of steel reinforing rods d. Grade stakes e. Frostlines f. Concrete mixture g. 16" stepped footing	Take notes and discuss Study and use blueprints and specifications Build form for footing Build form for 16" stepped footing Practice estimating material	A-1 B-1 B-2 C-8 E-21 E-29
D. Foundation Walls	Lecture Present types of foundations and advantages and disadvantages of each: a. Concrete b. Block masonry Explain importance of and methods of water proofing foundation walls	Take notes and participate in class discussions	A-1 E-9 A-7 E-10 A-23 E-14 B-1 E-19 B-2 E-20 E-2 E-24 E-4 E-38 E-5
E. Forms	Lecture and Demonstration Explain importance of erecting straight, plumb, and well braced forms. Present following types of forms and explain how to erect them.	Study basement blueprint Participate in discussion Practice building forms	A-4 E-8 A-5 E-9 A-18 E-10 A-24 E-19 E-2 E-20 E-4 E-24 E-5 E-38 E-7 E-41

FOUNDATION AND FORMS: (continued) Block No. 3

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
A. Forms (continued)	Lecture and Demonstration (continued) a. Sectional form b. Wall form c. Step form d. Walk form		

FLOOR AND WALL FRAMING

BLOCK FOUR

A. Types of Wall and Floor Framing

B. Foundation Sill

C. Girders

D. Floor Joist

E. Framing for Openings

F. Bridging

G. Sub-Flooring

H. Walls and Bearing Partitions

I. Ceiling Joist

J. Storm Siding

K. Furring and Grounds

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
A. Types of Wall and Floor Framing	Lecture and Demonstration Describe following types of framing; give advantages and disadvantages of each: a. Balloon framing b. Western or platform framing c. Plank and beam framing	Take notes, participate in class discussion, and read related material	A-1 B-3 A-2 C-7 A-34 E-4 A-9 E-7 A-29 E-18
B. Foundation Sill	Explain and demonstrate the following: a. Sill placement 1. Function, importance, and size of sill 2. Measuring and cutting sill 3. Importance of termite shield and how it should be installed 4. Drilling and anchoring sill b. Sill layout 1. How to determine and mark center for joist 2. How to locate girders 3. How to locate openings	Study blueprints and specifications Practice laying out sill Practice drilling and anchoring sill	A-1 A-2 A-3 A-4 A-9 A-29 B-3 E-7 E-18 E-24 A-1 B-2 E-7 A-2 B-3 E-18 A-3 B-4 A-4 C-8 B-1 E-4
C. Girders	Lecture and Demonstration Explain types of girders and their importance. Emphasize the following:		A-1 A-29 A-2 B-3 A-3 E-7 A-4

22

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
C. Girders (continued)	Lecture and Demonstration (continued) a. Girder sizes b. Spacing of girders c. Construction of built-up girders	Take notes, study blueprints, estimate loads, calculate materials, practice constructing built-up girders, and practice laying out girders on foundation sill	A-1 B-3 A-2 E-7 A-3 A-4 A-9 A-29
D. Floor Joist	Lecture and Demonstration Explain and emphasize the importance of following: a. Joist sizes and length b. Laying out sill for joist c. Methods of framing joist to girders d. Methods of framing joist to foundation sill e. Nailing joists f. Joist hangers	Take notes, study blueprints, use proper tools to measure, layout, cut, and install joists Construct "L" sill and "T" sill. Install joist hangers	A-1 A-2 A-3 A-4 A-9 A-29 B-3 C-9 E-7
E. Framing Openings in Sub-Floor	Review methods of locating openings and demonstrate the special framing needed in the joist system for openings.	Take notes, practice laying out openings and marking for identification, practice measuring, cutting, and installing headers, trimmers, and tail joists	A-22 C-5 E-19

FLOOR AND WALL FRAMING: (continued) Block No. 4

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
F. Bridging	Lecture and Demonstration Emphasize the purpose and types of bridging: a. Cross or herringbone bridging b. Block bridging c. Metal bridging Demonstrate the method of cutting bridging using framing square Discuss and demonstrate spacing and installing of bridging	Take notes, practice laying out, cutting, and installing the various types of bridging	A-22 C-8 E-19
G. Sub-Floor	Lecture Discuss the various types of materials used for sub-floors and give advantages and disadvantages of each. Contrast types as to cost of material, labor, and quality. Demonstrate the proper installation of the various types.	Take notes, estimate the cost of material and labor for a specific job, practice installing diagonally laid boards for sub-floor, practice laying plywood sub-floors	A-22 C-8 E-19
H. Walls and Bearing Partitions	Lecture and Demonstration Identify the various members of the wall frame. Emphasize purpose and importance of accuracy in measuring, locating, and cutting the framing members.	Take notes, class discussion and questions	A-22 C-8 E-19

42

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
H. Walls and Bearing Partitions (continued)	Explain the location of walls and openings using the blueprints Demonstrate determining the location, size, cutting and installing of the following: a. Sole plate b. Top plate c. Double plate d. Regular studs e. Ties f. Corner posts g. Jacks h. Cripple studs i. Headers j. Sills k. Fire stops Demonstrate: Safe way to raise and brace a wall on a platform	Study blueprints Work problems in calculating stud lengths and number of studs needed Make "Master stud plan" Cut studs to proper length Practice building corner posts Practice locating openings and determining size of rough frame openings Practice laying out sole and top plate Assemble walls and erect plumb and square Demonstrate how to tie corner and partitions	A-4 A-5 A-7 B-3 B-4 C-7 C-8 C-9 E-2 E-5 E-7 E-8 E-11 E-23 E-25 E-27 E-31
I. Ceiling Joist	Lecture Explain purposes of ceiling joists and what determines their size and spacing. Emphasize safety in construction. Demonstrate how ceiling joists are laid out. Explain uses of trusses as ceiling joists and demonstrate how the various types are built	Take notes and study blueprints Entertain questions and class discussion Layout top plate for ceiling joist Layout and assemble truss according to plan	A-4 A-5 A-7 B-3 B-4 C-7 C-8 C-9 E-2 E-5 E-7 E-8 E-11 E-23 E-25 E-27 E-31

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
J. Storm Siding	Lecture Discuss various types of storm siding, emphasizing advantages and disadvantages as to the cost of material, cost of labor, and quality of material. Explain how various types of siding are estimated and installed. Demonstrate installation of fibrous material, plywood, and wood board storm siding. Emphasize safety as it applies to the application of storm siding and scaffolding.	Take notes and study specifications for siding Questions and discussion Estimate amount of siding needed according to blueprint Practice installing the various types of siding	A-5 A-21 E-2 E-5 E-7 E-8 E-11 E-23 E-25 E-27 E-31
K. Furring and Grounds	Lecture Explain what is meant by furring and grounds; where they are needed. Explain what determines size of furring strips and grounds. Demonstrate measuring and installing grounds, furring strips and lath catchers	Take notes Entertain questions and class discussions Measure, cut, and install grounds, furring strips, and lath catchers as needed according to drawings	E-2 E-5 E-7 E-8 E-11 E-27 E-31

ROOF FRAMING

BLOCK FIVE

A. Styles of Roofs

B. Roof Framing Terms

C. Principles of Roof Framing

D. Roof Plan

E. Unequal Pitch Roof

ROOF FRAMING: Block No. 5

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
A. Styles of Roofs	Lecture and Demonstration Familiarize the student with the following styles of roofs and the various combinations of them found in today's buildings: a. Shed roof b. Gable roof c. Gambrel roof d. Mansard roof	Take notes, participate in class discussion, and identify the different styles and combinations of styles from drawings	A-3 A-23 E-7 E-29
B. Roof Framing Terms	Lecture and Demonstration Present to the student the basic parts of a roof and their purposes. Emphasize the following: a. Ridge B. Rafter plate c. Rafters 1. Common 2. Hip 3. Valley 4. Jack 5. Cripple 6. Overhang (tail rafter) 7. Birdsmouth 8. Chimney saddle	Take notes, read related material, and study roof framing plan	A-3 C-7 C-11 E-7 E-29 E-27 E-35

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
C. Principles of Roof Framing	Lecture and Demonstration Present to the student the principles involved in roof framing listed below: a. Identify and solve for the unknown in a right triangle b. Run, rise, and span c. Length of rafter d. Unit of measurement e. Application of unit measurement f. Pitch g. Plumb cut, seat cut h. Job safety	Take notes, solve problems in roof construction Entertain questions and discussion	A-3 C-7 C-11 E-7 E-29 E-27 E-35
D. Roof Plan	Lecture Explain the purpose and necessity of an accurate roof plan. Demonstrate the following: a. Laying out rafters 1. Common rafter 2. Hip rafter 3. Valley rafter 4. Jack rafter 5. Cripple rafter b. Shortening rafter at the ridge c. Backing off the hip rafter d. Bay window roof framing	Solve roof problems and layout, cut and nail in place each type of rafter Design roof braces and install	A-3 A-23 C-7 E-7 E-27 A-3 B-3 C-11 C-1 E-27 E-29 E-38

ROOF FRAMING: (continued)

Block No. 5

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
D. Roof Plan	Lecture (continued) e. Bracing the roof f. Gable end framing g. Marking and using a layout tee h. Job safety		
E. Unequal Pitch Roof	Lecture and Demonstration Explain what is meant by unequal pitch roof and give some of the framing problems resulting Demonstrate the following operations involved with unequal pitch roofs: a. Using step-off method for jacks b. Unequal pitch roof without overhang c. Making a plan layout d. Laying out unequal pitch hip rafter e. Laying out unequal pitch valley rafter f. Laying out unequal pitch hip and valley jacks g. Laying out unequal pitch roof with overhang h. Job safety	Take notes, questions and discussions Draw roof plan Lay out, cut and install the different rafters for unequal pitch roof according to plan	A-3 C-11 C-1 E-27 E-36

ROOF COVERING

BLOCK SIX

A. Sheathing

B. Roofing

C. Flashing

ROOF COVERING: Block No. 6

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
A. Sheathing	Lecture Describe types and installation a. Strip sheathing b. Plywood (clips) c. Square edge S4S d. Tongue and grooved Demonstrate cutting and nailing	 Estimate material Install on structure	B-4 C-11 E-7 E-25 E-29 E-25
B. Roofing	Lecture Describe types and contrast as to quality, cost, and ease of construction Explain type roof for which each is suited: a. Shingles 1. Wood 2. Asbestos 3. Asphalt 4. Fiber glass b. Felt c. Terra cotta d. Roll roofing e. Metal f. Slate g. Built-up	 Estimate material Apply on house or practice area	B-4 C-11 E-7 E-29 E-35

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
B. Roofing (continued)	Lecture (continued) Demonstrate application: a. Nailing b. Stapling c. Clips	Practice application of most common type roofing	B-4 E-29 C-11 E-7
	Lecture Discuss purpose of flashing and where needed a. Dripstrip b. Eave flashing c. Valley flashing d. Wall flashing e. Chimney flashing	Questions and class discussion	B-4 C-11 E-7 E-29 E-35
	Demonstrate application of flashing: a. Nailing b. Mastic	Apply on building or practice area	B-4 C-11 E-7 E-29 E-35

EXTERIOR WALL FINISHES AND TRIM

BLOCK SEVEN

A. Windows

B. Doors

C. Cornice

D. Exterior Wall Finishes

EXTERIOR WALL FINISHES AND TRIM: Block No. 7

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
A. Windows	Lecture Discuss the following: a. Types of windows 1. Wood sash 2. Metal sash 3. Double hung 4. Casement 5. Sliding 6. Louver 7. Awning 8. Fixed b. Dimensioning 1. Standard sizes	Study blueprints, specifications, and window schedule Class discussion	A-2 B-3 B-4 C-4 E-5 E-27 E-28
	Demonstrate frame construction and installation a. Flashing b. Vapor barrier c. Nailing	Align tops of windows Flash, level, square, and nail in place	
B. Doors	Lecture Describe types of doors and standard sizes a. Flush 1. Solid 2. Hollow core	Take notes Entertain questions and class discussions	A-2 B-3 B-4 C-4 E-5 E-27 E-28

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
B. Doors (continued)	Lecture (continued) b. Panel c. Metal d. Glass e. Batten Identify door as to right or left hand Demonstrate fitting and hanging doors	Practice fitting and hanging doors	
C. Cornice	Lecture Describe the following: a. Open cornice b. Box or closed cornice c. Cornice return d. Sloping plancier e. Cornice with sweep f. Vents g. Cornice molding h. Safety Demonstrate constructing cornices for frame and brick veneered dwellings	Take notes Study detailed drawings of cornices Estimate cornice material Install cornices	A-3 C-4 E-5 E-27 E-28 H-4

EXTERIOR WALL FINISHES AND TRIM: (continued) Block No. 7

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
D. Exterior Wall Finishes	Lecture and Demonstration Describe and demonstrate application of following: a. Types of siding 1. Board on board 2. Board and batten 3. Bevel 4. Vertical 5. Plywood panel with batten b. Water table c. Corner boards d. Porch and recess entrance trim e. Belt course f. Vapor barrier g. Safety	Estimate material Read related material Install siding and wall trim	A-3 A-21 C-4 E-5 E-27 E-28 H-4

INSULATION, INTERIOR WALL AND CEILING FINISHES

BLOCK EIGHT

A. Insulation

B. Preparing for plaster

C. Dry wall

D. Paneling

E. Ceiling finishes

INSULATION, INTERIOR WALL AND CEILING FINISHES Block No. 8

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
A. Insulation	Lecture and Demonstration Emphasize importance of properly insulating a house. Demonstrate application of insulation. a. Rock wool b. Fiber glass c. Aluminum d. Blown in e. Sprayed on styrofoam	Take notes Install insulation	A-21 E-25 E-26 E-29
B. Preparing for Plaster	Lecture and Demonstration Describe and demonstrate application of following: a. Rock lath b. Metal lath c. Corner right d. Corner bead e. Plaster grounds f. Fasteners	Apply lath, grounds, corner right, and corner bead	E-5 E-23 E-27
C. Dry Wall	Lecture Define dry wall construction and emphasize advantages and disadvantages. Demonstrate following: a. Cutting and hanging sheetrock b. Laminating	Estimate material Install sheetrock Apply corner bead Tape, finish joints, and nail heads	A-4 C-3 E-5 E-27 E-29 H-4

INSULATION, INTERIOR WALL AND CEILING FINISHES: Block No. 8
(continued)

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
C. Dry Wall (Continued)	Lecture (continued) c. Corner bead d. Finishing joints e. Estimating f. Safety		A-4 C-3 E-5 E-27 E-29 H-4
D. Paneling	Lecture Describe types of paneling a. Wood b. Composition c. Plastic	Take notes and read related material	A-4 C-3 E-5 E-27 E-29
	Demostrate a. Estimating b. Matching c. Scribing and fitting d. Fastening	Apply paneling	H-4
E. Ceiling Finishing	Lecture Discuss the types of ceiling finishes a. Plaster b. Dry wall c. Tile d. Suspended e. Exposed	Install tile and suspended ceiling	A-4 C-3 E-5 E-27 E-29 H-4

INTERIOR TRIM

BLOCK NINE

A. Window Trim

B. Flooring

C. Door Trim

D. Baseboard

E. Other Trim

41

INTERIOR TRIM: Block No. 9

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
A. Window Trim	Lecture Describe styles of window trim a. Plain b. Moulded c. Back band d. Cabinet head Describe members used in window trim. a. Side and head casing b. Stool c. Apron d. Stop Demonstrate methods of cutting and fitting window trim.	Read related material Questions and discussion Fit stool for double hung and casement window Fit window stop, casing, and apron	A-4 A-7 C-3 E-5 E-7 E-27 E-28 E-31
B. Flooring	Lecture Describe the following: a. Hardwood b. Underlayment 1. Tile 2. Carpeting c. Tile d. Parque	Questions and class discussion	A-1 A-4 C-3 E-5 E-7 E-27 E-28 E-31

INTERIOR TRIM: (continued) Block No. 9

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
B. Flooring (continued)	Demonstrate estimating and installing various types of floor	Estimate material Install underlayment Install flooring	
C. Door	Lecture Describe types: a. Flush b. Panel c. Bi-fold d. Pocket e. By-pass f. Double action	Take notes Class discussion	A-1 A-4 C-3 E-5 E-7 E-27 E-28 E-31
	Describe types of door trim a. Plain b. Cabinet head c. Moulded casing d. Back band casing e. Door stop		
	Demonstrate a. Setting jambs b. Fitting door c. Fitting casing d. Fitting stop e. Setting hinges f. Installing lock assembly g. Installing pre-hung door	Install complete door assembly Install pre-hung door	

43

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
D. Baseboard	Lecture Describe different types of baseboards a. Wood 1. Plain 2. Built-up 3. Moulded b. Rubber c. Plastic d. Ceramic	Take notes Questions and class discussion	A-2 A-4 C-3 E-5 E-7 E-27 E-28 E-31
	Demonstrate: a. Estimating material b. Methods of installing baseboard and returns	Estimate material Cope and miter corners Install in place	
E. Other Trim	Lecture Describe the following: a. Wainscoat b. Chair rail c. Inside cornice d. Special millwork e. Crown moulding f. Bed moulding g. Cove moulding h. Base shoe	Take notes Class discussion	A-4 C-3 E-5 E-7 E-27 E-28 E-31

INTERIOR TRIM: (continued) Block No. 9

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
E. Other Trim (continued)	Demonstrate cutting and fitting a. Crown moulding b. Bed moulding c. Cove moulding d. Base shoe	Cut and fit moulding in building	

STAIR BUILDING

BLOCK TEN

A. Introduction

B. Stairway Construction

C. Stairway Layout

D. Stairway Terms

STAIR BUILDING: Block No. 10

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
A. Introduction	Lecture Describe the following types of stairs: a. Straight and platform b. Rough c. Closed d. Open		A-4 E-36 A-7 E-39 B-3 H-2 C-12 C-2 E-27 E-29
	Lecture Explain construction of the following: a. Stair horses 1. Saw out 2. Built-up b. Stair stringers 1. Plain 2. Square cut 3. Mitered 4. Housed	Study drawings Entertain questions and class discussion	A-4 A-7 B-3 C-12 C-2 E-27 E-29 E-36 E-39 H-2
	Lecture Define the following terms and explain methods of determining dimensions needed: a. Total rise b. Unit of rise c. Total run d. Tread run e. Riser and tread f. Head room g. Horse or stringer length	Solve stair layout problems Layout stair stringers	A-4 A-7 B-3 C-12 C-2 E-27 E-29 E-36 H-2

STAIR BUILDING: (continued) Block No. 10

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
D. Stairway Terms	Lecture Describe and demonstrate with drawings of stair assembly: a. Balusters b. Buttress Cap c. Fillet d. Glue blocks e. Hand rail f. Stair molding g. Newel post h. Nosing i. Riser j. Tread k. Tread projection l. Well hole	Take notes Study detail drawings on blueprints Assemble related parts	A-4 A-7 B-3 C-12 C-2 E-27 E-29 E-36 E-39 H-2

PRE-EMPLOYMENT CLINIC

BLOCK ELEVEN

A. Employment Application

B. Employment Opportunities

C. Employer - Employee Relationship

D. Civic and Social Responsibility

PRE-EMPLOYMENT CLINIC Block No. 11

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
A. Employment Application	Lecture and demonstration, completing sample application. Discuss the following: a. Social security b. Reference c. Work experiences d. Emergency information e. Personal appearance f. The interview g. Follow up	Class discussion Complete sample application Practice interview with instructor or other students	
	Lecture Discuss the following: a. Jobs available and average wage b. Placement officials c. Apprenticeship programs d. Virginia Employment Commission e. Civil Service f.. Armed Forces g. What employer expects from employee h. What employee should expect from employer i. Workman compensation laws j. Unemployment insurance laws	Class discussion	

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
C. Employer - Employee Relationship	Lecture Discuss the following: a. Employer responsibility Working conditions 1. Clean work area 2. Safety equipment 3. Reasonable work hours 4. Vacation 5. Adequate insurance 6. Incentive bonus 7. Administrative guidance 8. Reasonable wage b. Employee responsibility 1. Punctuality 2. Knowledge and skill of his trade 3. Safe work habits 4. Proper dress 5. Good Character traits a. honesty b. dependability c. high morality d. cooperative 6. Reasonable amount of work per day 7. High aspirations	Class questions and discussion	

PRE-EMPLOYMENT CLINIC

Block No. 11

UNITS OF INSTRUCTION	INFORMATION	SKILL-DEVELOPMENT ACTIVITIES	INSTRUCTIONAL AIDS
D. Civic and Social Responsibility	Lecture Encourage [illegible]nts to work to improve home [illegible]community a. Clean pe[illegible]l property b. Support wo[illegible]hwhile civic projects c. Appreciate the right to vote d. Learn to get along with others e. Appreciate the right of others f. Create interests in community	Questions and class discussion	

APPENDIXES

Materials such as Teacher's Guides, Aids, Tool Lists, Etc. are supplied only as examples. Those involved in developing this guide believe that these examples will be helpful.

APPENDIX A

Unit Guide Example, Block 2

DESCRIPTION OF THE UNIT GUIDE

The unit guide which follows will serve as an example of the preparation needed for teaching the various units of instruction. The teacher should develop unit guides for all of the eleven blocks in the curriculum guide. Lesson plans are included for selected lessons only and a completed unit guide should contain a lesson plan for each lesson title listed in the block breakdown. Each teacher should develop his own content and the lesson plans included here are intended to serve only as examples.

The approach for the unit guide is suggestive only and the teacher may elect to develop his own format.

UNIT GUIDE

COURSE Carpentry

UNIT NO. 2

NAME OF UNIT Foundation Layout and Forms

UNIT OBJECTIVES

As a result of your teaching and student learning, your students

will understand (mental)

1. The use of the transit level
2. Excavation and basement prints
3. The plot plan
4. The methods of building layout, and squaring corners
5. Steel reinforcing of concrete
6. Types of wall forms
7. The spacing of columns

will be able to (manipulative skill)

1. Locate house corners
2. Set up transit level
3. Construct batten boards
4. Build forms for footings, walls, and piers
5. Estimate material needed for foundations

will (attitudes and appreciations)

1. Practice safety rules
2. Develop proper attitude toward fellow workers

LESSON BREAKDOWN

BLOCK NO. 2 TITLE Foundation layout and forms

Doing Lessons		No.	Knowing Lessons
No.	HOW TO:		Technical Topics
D2-1	Locate house corners	K2-1	Form work safety
D2-2	Set up transit level	K2-2	Use of transit level
D2-3	Construct batten boards	K2-3	Excavation and basement blueprint reading
D2-4	Set Leveling stakes		
D2-5	Set building layout lines	K2-4	Plot plan reading
D2-6	Build form for footing	K2-5	6-8-10 method of squaring
D2-7	Build 16" stepped footing	K2-6	Lumber sizes
D2-8	Build wall form	K2-7	Concrete reinforcing steel
D2-9	Build form for pier	K2-8	Types of wall forms
D2-10	Estimate material	K2-9	Column spacing
			General Topics
		K2-10	Safe loads for various soils
		K2-11	Frost lines and footers
		K2-12	Concrete mixing and curing
			Guidance Topics
		K2-13	Forming as a specialty
		K2-14	Relationship of carpentry and masonry

TEACHING EXPEDIENTS

1. Reference - Textbooks

   Lair, E. A. Carpentry for the Building Trades, p. 7-28.

   Wilson, J. Douglas Practical House Carpentry, p. 57-83.

   Ulrey, Harry F. Carpenters and Builders Library, Vol. III.

   Carson, Arthur B. Foundation Construction.

2. Project-activity Materials

   50-survey stakes

   16-2"x4"x8' Construction grade

   8-3/4"x4"x8' Construction grade

   4-Rolls of cord

   16-3/4"x8"x12' Handyman

3. Demonstration Equipment

   Transit level

   Steel tape

   Line level

   Pencil

   6 ft. rule

   Survey stakes

   Nails

4. Other materials, equipment

   Opaque projector

   Overhead projector

   Transparencies
   House Framing 3M Catalogue #391, Part I

5. Resource persons

   Tour of house being staked out in the area.

SUGGESTED METHOD OF APPROACH

The following method of approach for this course unit is suggestive only. However, if you have had little experience in teaching the content of this unit, it is advisable that you follow the approach in detail for your first teaching. As you gain experience, new ways to demonstrate and make information topics dynamic will come to you and these should be recorded in the spaces between the steps in the teaching approach. The teaching approach below will run from the first to the last day of the unit. You will have to decide how much to cover each day the class meets.

SUGGESTED TEACHER APPROACH	STUDENT ACTIVITY
1. Introduce unit (30 min.) A. Check attendance. B. Explain new unit progress chart. C. Explain references available.	1. Class assembly A. Discussion and questions.
2. Form work safety (20 min.) K2-1 A. Lecture. B. Show pictures of forming hazards. C. Discussion.	2. A. Enter into discussion. B. Student recalls accidents from own experiences.
3. Use of transit level K2-2 (two lessons-45 min.) A. Description. B. Use opaque projector. C. Set up transit level.	Activity 1½ hours A. Work problems in math book. 3. A. Observe. B. Selected students name parts of level projected on screen. C. Questions.
4. Excavation and basement blueprint reading K2-3 (45 min.) A. Lecture. B. Give out blueprint reading workbooks.	Activity 1 hour A. Work problems in math book. 4. A. Draw and identify various lines. B. Dimension drawings on hand-out sheets. C. Work problems in workbook, pg. 12-13-14.
5. Plot plan reading K2-4 (45 min.) A. Lecture. B. Use plot plan drawing.	5. A. A discussion and questions B. Determine elevations of selected points on plot plan print. C. Answer questions in workbook.

(continued)

SUGGESTED TEACHER APPROACH	STUDENT ACTIVITY
6. 4-8-10 method of squaring K2-5 (45 min.) A. 20 minute lecture. B. Use chalk board to illustrate by right triangle. C. Assign problems in reading workbook.	6. A. Work problems on chalk board. B. Work in workbook. C. Questions. Activity 2 hours A. Cut survey view of basement wall.
7. Administer test on material covered so far.	7. A. Discussion following test.
8. Locate house corners D2-1 (30 min.) A. Review methods. B. Place problems on board. C. Assign student teams.	8. A. Work out problem by teams. Activity 2 hours and 20 minutes. A. Tool maintenance. B. Practice layout of building corners.
9. Set up transit level D2-2 (20 min.) A. Review procedure by demonstration.	9. A. Set up transit level individually. Activity 1 hour A. Practice building layout. B. Work on blueprint reading assignments.
10. Construct batter boards. D2-3 A. Demonstration (45 min.) B. Assign student teams	10. A. Construct batter boards by teams. Activity 3 hours A. Set building lines by teams.
11. Lumber sizes K2-6 (20 min.) A. Lecture. B. Demonstrate board foot table on a framing square. C. Work problems on board.	11. A. Questions. B. Work board foot problems in workbooks. Activity 1 hour A. Complete layout of building corners.

(continued)

SUGGESTED TEACHER APPROACH	STUDENT ACTIVITY
12. Set leveling stakes D2-4 (30 min.) A. Lecture	12. A. Work in groups leveling stakes. B. Check each others work Activity - 1½ hours A. Practice leveling stakes.
13. Set building layout line D2-5 (45 min.) A. Review B. Demonstration	13. A. Observe B. Same as K2-4 Activity - 2 hours A. Practice layout of building lines.
14. Concrete reinforcing steel K2-1 (30 min.)	14. A. Questions
15. Build forms for footing D2-6 (45 min.) A. Demonstration	15. A. Observe work in groups building forms.
16. Build 16" stepped footing D2-7 (45 min.) A. Demonstration	16. A. Same as D2-6 Activity - 3 hours A. Work on forms
17. Types of wall forms K2-8 (20 min.) A. Lecture B. Use opaque projector	17. A. Questions and discussion
18. Administer test on work covered last time. (50 min.)	18. A. Discuss test
19. Build wall form D2-8 (45 min.) A. Demonstration	19. A. Observe B. Work in groups Activity - 3 hours A. Build wall forms in groups
20. Column spacing K2-9 (45 min.) A. Lecture B. Use opaque projector	20. A. Discussion B. Work problems on spacing column

(continued)

SUGGESTED TEACHER APPROACH	STUDENT ACTIVITY
21. Build forms for pier D2-9 (30 min.) A. Demonstration B. Assign teams	21. A. Observe B. Work in assigned teams Activity - 2hours A. Estimate number of piers needed in illustrations. B. Build form for pier
22. Estimate material D2-10 (45 min.) A. Demonstrate from foundation.	22. A. Observe and follow along B. Estimate material for print in workbook Activity - 6 hours A. Estimate material needed for foundation from blueprint
23. Safe loads for various soils K2-10 (30 min.) A. Lecture B. Use opaque projector	23. Discussion Activity - 2 hours A. Work on uncompleted jobs on progress chart
24. Administer test (50 min.)	24. Discuss test
25. Frost lines and footers K2-11 (20 min.)	25. A. Discussion
26. Concrete mixing and curing K2-12 (30 min.) A. Lecture (10 min.) B. Use opaque projector to show pictures from magazine	26. A. Discussion Activity - 4 hours A. Work on incomplete items on progress chart.
27. Forming as a specialty K2-13 (10 min.)	27. A. Discussion
28. Relationship of carpentry and masonry K2-16 (20 min.) A. Lecture	28. A. Discussion and questions Activity - 3 hours A. Finish items on progress chart
29. Field trip to building site in area	29. Questions on field trip

INSTRUCTOR'S LESSON PLAN
Related Technical Information

INSTRUCTOR:

Unit 2
Lesson K-2

SUBJECT: Carpentry

AIM (or purpose): To describe the use and nomenclature of the transit level.

TEACHING AIDS: Transit level, opaque projector, text book

MATERIALS:

REFERENCES: McDonnell, L.P. Hand Woodworking Tools p.58-80
Handbook of Practical Applications of the Transit Level p. 1-22

I. PREPARATION (of the learner)

Introduction

1. The transit level is a precision made optical instrument which requires careful handling.
2. In order to use the level properly one must be familar with the parts of the instrument and their uses.
3. The transit level is a versatile tool and can be useful to a carpenter in many ways.

II. PRESENTATION (of the information)

INSTRUCTIONAL TOPICS	THINGS TO REMEMBER TO DO OR SAY
A. Nomenclature of transit level	A.
	1. Objective lens
	2. Focusing Knob
	3. Adjustable horizontal circle
	4. Index vernier
	5. Horizontal clamp screw
	6. Horizontal tangent screw
	7. Locking lever
	8. Vertical clamp screw
	9. Vertical tangent screw
	10. Index pointer
	11. Center screw and cap assembly
	12. Leveling screw

II. PRESENTATION (continued)

INSTRUCTIONAL TOPICS	THINGS TO REMEMBER TO DO OR SAY
	Method: Transit level projected on screenpoint out parts and their functions
B. Use of transit level for leveling	B. 1. How to measure a difference in elevation. 2. Computing differences in elevations 3. Math involved 4. Turn points 5. Leveling stakes 6. Grade marks 7. Set marks on a line Method: Lecture - Illustrations projected on screen with opaque projector. Work math problems.
C. Horizontal Circle scale and its vernier	C. 1. Used to read horizontal angles 2. A complete circle-360 degrees 3. Marked in degrees 4. Marked in four guadrants 5. "0" on the vernier is the index 6. 12 graduations on vernier numbered from 0-60 7. Read to nearest five minutes Method: Same as B.
D. Reading and measuring	D. 1. Plus vertical angle measured upward - minus downward 2. Vertical arc and vernier read as horizontal. 3. Plumb 4. Rate of slope
E. Summary	Method same as B.
F. Ask Questions	

II. PRESENTATION (continued)

INSTRUCTIONAL TOPICS	THINGS TO REMEMBER TO DO OR SAY

III. APPLICATION (drills, illustrations, analogies, oral questions or assignments)

1. Students work problems
2. Ask questions on illustrations

IV. TEST (final check on students' comprehension of material presented)

Test #2 on Tuesday

Suggested Reading for the student: p. 56-80 Hand Woodworking Tools

The Next lesson is: Excavation and basement blueprint reading.

INSTRUCTOR'S LESSON PLAN
Related Technical Information

INSTRUCTOR:

Unit 2
Lesson K-3

SUBJECT: Carpentry

AIM (or purpose): To provide information for the student to correctly interpret excavation and basement blueprints.

TEACHING AIDS: Blueprints-Basement model

MATERIAL:

REFERENCES: Blueprint Reading and Sketching for Carpentry Trades -p 7-79

I. PREPARATION (of the learner)

1. The foundation of a building is one of the most important parts of a building.
2. Regardless of the type of framing or how rigidly the frame is built, if an inadequate foundation is provided the frame will probably settle unevenly resulting in cracking of plaster, floor, tile, and ill-fitting doors and windows.
3. If foundation dimensions are not accurate, framing and finishing problems will exist throughout the job.

II. PRESENTATION (of the information)

INSTRUCTIONAL TOPICS	THINGS TO REMEMBER TO DO OR SAY
A. Identification and purpose of lines in drawing.	A. 1. Object lines 2. Extension lines 3. Dimension lines 4. Hidden lines 5. Sections - cutting plane lines 6. Center lines

II. PRESENTATION (continued)

INSTRUCTIONAL TOPICS	THINGS TO REMEMBER TO DO OR SAY
B. Methods of Dimensioning	B. 1. Scale 2. Outside face to center of partition 3. Overall 4. Location of openings a. To center of opening b. To side of opening 5. Actual dimensions of material
C. Symbols	C. 1. Concrete 2. Cinder block 3. Gravel 4. Brick 5. Stone 6. Windows and doors 7. Plumbing 8. Electrical
D. Use of lettering on basement plan	D. 1. Identify material 2. Elevation information 3. Identify rooms 4. Label fixtures
E. Summary	
F. Questions	F. Blueprint reading workbook-pages 20-21, 57-58, 76-77.

II. PRESENTATION (continued)

INSTRUCTIONAL TOPICS	THINGS TO REMEMBER TO DO OR SAY

III. APPLICATION (drills, illustrations, analogies, oral questions or assignments)

1. Students draw sectional view of a typical basement wall.
2. Work problems in workbook - pages 56-57.

IV. TEST (final check on students' comprehension of material presented)

1. Test #4 on Tuesday
2. Check students' drawings

Suggested Reading for Student: pages 7-79 Blueprint reading text.

The Next Lesson Is: Construct batter boards

INSTRUCTOR'S LESSON PLAN
Manipulative Skills

INSTRUCTOR:

Unit 2
Lesson D-2

JOB (or operation): Set up transit level

AIM (or purpose): Gain skill in preparing level for use.

TOOLS AND EQUIPMENT: Transit level, tripod, plumb bob

MATERIALS: Survey stakes, 8d finishing nails

TEACHING AIDS:

REFERENCES: McDonnell, L.P., Hand Woodworking Tools, p. 58-80

I. PREPARATION (of the learner)

1. Leveling is the most important operation in preparing to use the instrument.

2. Errors of leveling are costly in time and sometimes in materials.

II. PRESENTATION (of the skills):

Operation or Steps	Key Points (things to remember to do or say)
Set up level	
A. Adjust tripod	A. 1. Loosen wing nuts 2. Spread legs about 3 ft. apart 3. Push legs firmly in ground 4. Unscrew tripod cap 5. Level top of tripod by eye
B. Place instrument on tripod	B. 1. Adjust horizontal clamp screw 2. Screw instrument firmly in place
C. Set up over point	C. 1. Place level over point 2. Tie on plumb bob 3. Push legs firmly in ground 4. Adjust plumb bob 1/8"above point 5. Loosen leveling screws and shift plate

II. PRESENTATION (of the skills)

Operations or Steps	Key Points (things to remember to do or say)
D. Level instrument	D. 1. Loosen two adjacent screws 2. Align telescope over a pair 3. Center the bubble 4. Turn telescope 90° and repeat leveling 5. Continue with alternate pairs
E. Ask Questions	E. 1. Why do you place telescope over a pair of leveling screws in leveling? 2. Which way do you turn a leveling screw to raise the plate? 3. Do you always turn two screws at a time in leveling?

III. APPLICATION (practice by learner under close supervision)

Students work individually setting up and leveling transit level

TEST (Performance of skill to acceptable standards)

Check each student as he completes leveling operation

Suggested Reading for Student:

The Next Lesson Is: Construct batter boards

II. PRESENTATION (of the skills):

Operations or Steps	Key Points (things to remember to do or say)
C. Construct batter boards	C. 1. Consists of 3 stakes 2. Two horizontal members 3. Two braces 4. Stake correctly pointed 5. Level horizontal member 6. Construct higher than foundation 7. Leveling by straight edge 8. Leveling with transit level 9. Reverse level and straight edge
D. Ask Questions	D. 1. Why are batter boards needed? 2. Why are batter boards made of heavy material? 3. Where should batter boards be placed? 4. Why is it necessary to have all batter boards level?

III. APPLICATION (practice by learner under close supervision)

Students work in pairs - students check work

TEST (performance of skill to acceptable standards)

1. Test #5 on Tuesday
2. Enter grades on progress chart

Suggested Reading for Student: pages 9-11, Lair - pages 61-62, Wilson

The Next Lesson Is: The Plot Plan

TEST #1

COURSE: _____ DATE: _____

INSTRUCTOR: _____ SCHOOL: _____

SUBJECT: _____ SCORE: _____

MULTIPLE CHOICE:

Directions: Each of the questions or incomplete statements listed below is follwed by several words, phrases, or series of numbers. From these you are to choose the one which best answers the question or completes the statements correctly. Place the letter of that word or phrase (A,B,C,D, or E) in the numbered blank space on the answer sheet.

Example:

A room has sides 10'-0" by 13'-6". The total distance of the baseboard would be:

__A__ A. 47 Feet

_____ B. 78 Feet

_____ C. 135 Feet

_____ D. 136 Feet

_____ E. 315 Feet

1. The three dimensions a carpenter can use to lay out a square or 90^{o} corner are:

   A. 1' x 2' x 3'

   B. 2' x 4' x 6'

   C. 4' x 6' x 8'

   D. 6' x 8' x 10'

   E. 8' x 10' x 12'

2. The major cause of accidents

   A. Ignorance

   B. Horseplay

   C. Forgerfulness

   D. Carelessness

   E. Sickness

3. It is standard parctice to accompany each set of plans with a detailed set of written instructions called

   A. Contracts

   B. Sections

   C. Specifications

   D. Details

   E. Building instructions

4. In laying out a building, the tool best suited to measure distances is a

   A. 6' folding rule

   B. Steel tape

   C. Pocket rule

   D. Cloth tape

   E. Measuring stick

5. Which of the following is <u>not</u> found on the plot plan?

   A. Contour lines

   B. Building set boch

   C. Finish elevation

   D. Dimensions of the lot

   E. The heighths of foundation wall

6. The best wood to make a straight edge from is

A. Mahogany

B. White pine

C. Redwood

D. Hemlock

E. Douglas fir

LEVELING INSTRUMENT:

MATCHING ITEMS:

Directions: Indicate the statement in the right hand column that matches the part in the left hand column. Place the appropriate letter for the statement in the place provided on the answer sheet. Statements may be used only once.

____7.	Tangent screws	A.	Used for making fine adjustments
____8.	Tripod plate	B.	Is in closed position when instrument is being used as a level
____9.	Trivet points	C.	Graduated from 0^{o} to 45^{o}
____10.	Horizontal circle	D.	Used to firmly hold settings
____11.	Horizontal vernier	E.	Attaches legs firmly to tripod plate
____12.	Clamp screw	F.	Used to level telescope
____13.	Tripod cap	G.	Graduated in degrees
____14.	Vertical arc	H.	Serves as legs for level
		I.	Supports for leveling screws
		J.	For protecting threads
		K.	Graduated in minutes

MODIFIED TRUE-FALSE:

Directions: Some of the following statements are true and some are false. If the statement is true, black out the circle under the "T" column on the answer sheet and do no more. If the statement is false, black out the circle under the "F" column on the answer sheet and do two more things:

1. In blank "A" on the answer sheet insert the word or phrase that makes the statement false.

2. In blank "B" insert the word or phrase that would make the statement true. Do not use words that are underlined.

Example:

T F A square corner is 60 degrees.

A. 60

B. 90

15. If the hypotenuse of a right triangle is five feet and the base is four feet, the altitude would be three feet.

16. The distance from the front property line to the building is found on the basement plan.

17. Batter boards should be made of 3/4" stock.

18. You can check your building layout for squareness by measuring the diagonals.

19. The front stakes should be moved to make adjustments in squaring.

ESSAY QUESTIONS:

Directions: Answer the following questions as complete as possible in the space provided on the answer sheet.

20-25. Describe the construction of batter boards as to location, material used and to their purpose.

ANSWER SHEET
TEST # 1

MULTIPLE CHOICE:

	A	B	C	D	E
1.	0	0	0	0	0
2.	0	0	0	0	0
3.	0	0	0	0	0
4.	0	0	0	0	0
5.	0	0	0	0	0
6.	0	0	0	0	0

MATCHING ITEMS:

	A	B	C	D	E	F	G	H	I	J	K
8.	0	0	0	0	0	0	0	0	0	0	0
9.	0	0	0	0	0	0	0	0	0	0	0
10.	0	0	0	0	0	0	0	0	0	0	0
11.	0	0	0	0	0	0	0	0	0	0	0
12.	0	0	0	0	0	0	0	0	0	0	0
13.	0	0	0	0	0	0	0	0	0	0	0
14.	0	0	0	0	0	0	0	0	0	0	0

MODIFIED TRUE-FALSE:

	T	F		
15.	0	0	A._____	B._____
16.	0	0	A._____	B._____
17.	0	0	A._____	B._____
18.	0	0	A._____	B._____
19.	0	0	A._____	B._____

PROGRESS CHART

JOB NO.	JOBS / NAMES
1	Locate house corners
2	Set up transit level
3	Construct batter boards
4	Set leveling stakes
5	Set building lay-out lines
6	Build forms for footing
7	Build 16" stepped footing
8	Build Wall form
9	Build form for pier
10	Estimate material

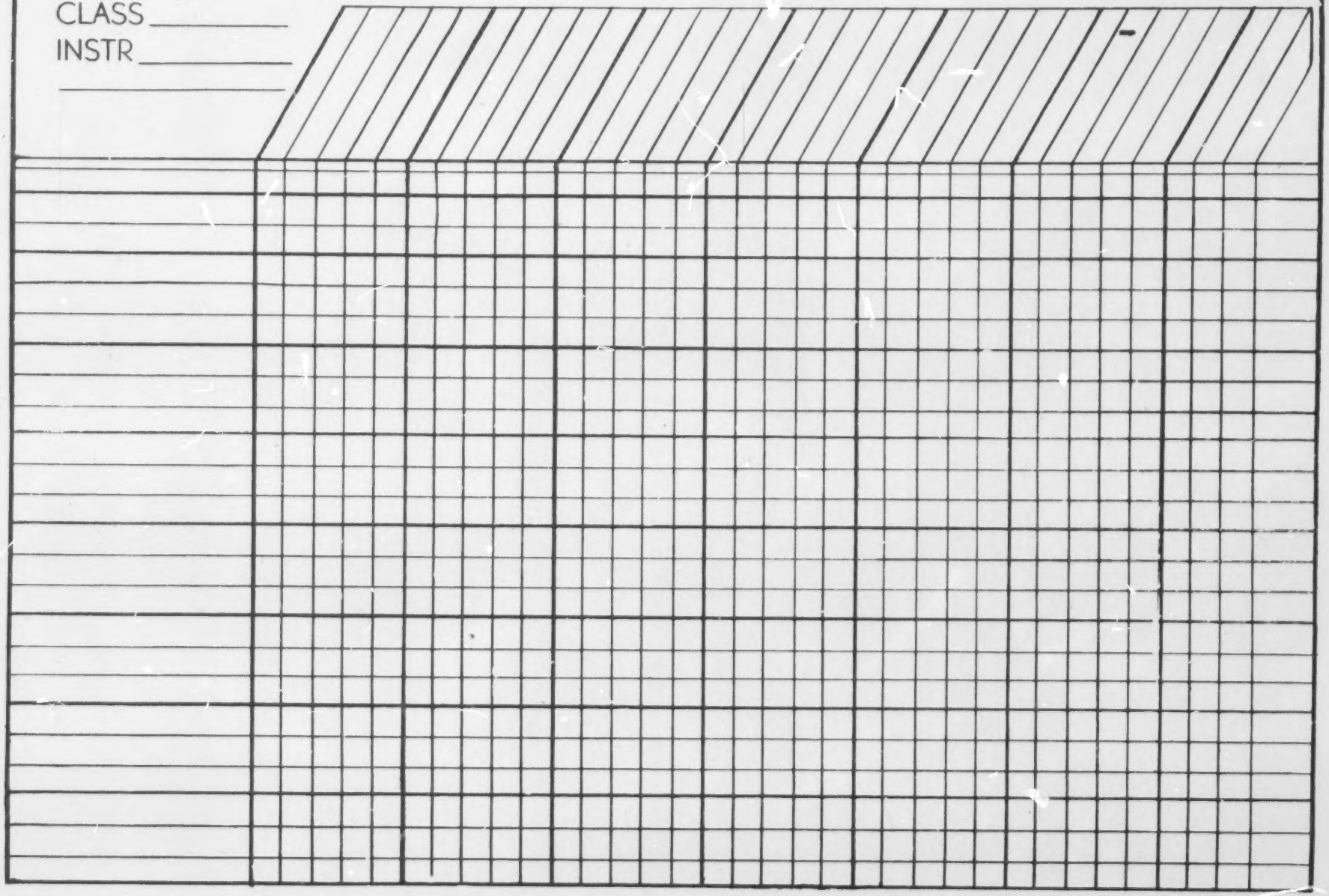
DATE ____ to _____

CLASS _____

INSTR _____

_____

PROGRESS CHART



Virginia Department of Education
Division of Vocational Education

APPENDIX B

BOOKS AND VISUAL MATERIAL

CODE INDEX

A. Films

B. Filmstrips and Slides

C. Transparencies

D. Film Loops

E. Books

F. Flip Charts

G. Workbooks

H. Pamphlets

I. Handout Material

J. Wall Charts

REFERENCES FOR INSTRUCIONAL AIDS

Teaching aids--16mm. motion pictures

A-1 Building Techniques: Foundationa and Concrete
Source: All Scope Pictures--Produced by USN, Office of Technical Information. 26 minutes--B/W, (no address). Rental-$4.40.

A-2 Building Techniques: Framing--Floor Joists and Wallls
Source: All Scope Pictures--Produced by USN, Office of Technical Information. 30 minutes--B/W. (no address). Rental-$4.40

A-3 Building Techniques: Rafter Principles and Common Rafters
Source: All Scope Picture--Produced by USN. 30 minutes--B/W. (no address). Rental-$4.40.

A-4 Building a House; 2nd edition
Produced by Encyclopedia Britannica. 12 minutes--color. (available through UVA. Charlottesville,Va.; Longwood College, Farmville, Va. Rental-no charge.

A-5 Structure
Produced and distributed by West Coast Lumbermen's Association, 1410 S. Morrison Street, Portland, Oregon 97205. 13 minutes--B/W. Rental-$5.00.

A-6 Stay in School
Produced and distributed by Bailey Films, 6509 DeLorpre Avenue, Los Angeles, California 90028. 11 minutes--color. Rental-$6.00.

A-7 Building America's Houses
Source: Bureau of Teaching Materials, State Department of Education, Richmond, Va. 23216. 11 minutes--color--B/W. Rental-no charge.

A-8 Safety with Fire
Source: Bureau of Teaching Materials, State Department of Education, Richmond, Va. 23216. 11 minutes--B/W. Rental-no charge.

A-9 Safety in the Shop
Source: Bureau of Teaching Materials, State Department of Education, Richmond, Va. 23216. 12 minutes--B/W. Rental-no charge.

A-10 Safety Rules for School
Source: Bureau of Teaching Materials, State Department of Education, Richmond, Va. 23216. 10 minutes--B/W. Rental-no charge.

A-11 Safe Use of Tools
Source: Bureau of Teaching Materials, State Department of Education, Richmond, Va. 23216. 10 minutes--B/W. Rental-no charge.

A-12 Industrial Arts--A Safe Shop
Source: Bureau of Teaching Materials, State Department of Education, Richmond, Va. 23216. 10 minutes--B/W (1944). Rental-no charge.

A-13 Industrial Arts--Boring and Drilling Tools
Source: Bureau of Teaching Materials, State Department of Education, Richmond, Va. 23216. 12 minutes--B/W (1954). Rental-no charge.

A-14 Industrial Arts--Chisels and Gauges
Source: Bureau of Teaching Materials, State Department of Education, Richmond, Va. 23216. 12 minutes--B/W (1945). Rental-no charge.

A-15 Industrial Arts--Handsaws
Source: Bureau of Teaching Materials, State Department of Education, Richmond, Va. 23216. 11 minutes--B/W (1953). Rental-no charge.

A-16 Industrial Arts: Measuring and Squaring
Source: Bureau of Teaching Materials, State Department of Education, Richmond, Va. 23216. 11 minutes--B/W (1953). Rental-no charge.

A-17 Industrial Arts--Planes
Source: Bureau of Teaching Materials, State Department of Education, Richmond, Va. 23216. 11 minutes--B/W (1953). Rental-no charge.

A-18 Industrial Arts--Using Screws and Nails
Source: Bureau of Teaching Materials, State Department of Education, Richmond, Va. 23216. 11 minutes--B/W (1953). Rental-no charge.

A-19 Industrial Arts--Joining and Glueing
Source: Bureau of Teaching Materials, State Department of Education, Richmond, Va. 23216. 15 minutes--B/W (1956). Rental-no charge.

A-20 Magic of Lumber
Source: V.P.E. & S.U., Learning Resource Center, #104 Media Building, Blacksburg, Va. 22 minutes--sound/color. Rental-no charge.

A-21 Siding Sense
Source: V.P.I. & S.U., Media Center, Blacksburg, Va. 12 minutes--sound/color. Rental-no charge.

A-22 Pattern
Source: V.P.I. & S. U., Media Center, Blacksburg, Va.--Produced by West Coast Lumbermen's Association. 15 minutes--sound/B/W. Rental-no charge.

A-23 Those Fabulous Pre-Fabs
Source: V.P.I. & S.U., Media Center, Blacksburg, Va. 15 minutes--sound/color. Rental-no charge.

8 mm. Motion Pictures

A-24 Carpenters
Source: Encyclopedia Britannica Educational Corporation, 425 North Michigan Avenue, Chicago, Illinois 60611. 4 minutes--color (cartridge N/S).

A-25 Hammer Handles and Faces
Source: Sterling Educational Films, P.O. Box 8497, Universal City, Los Angeles, California 91608. Color (cartridge N/S).

A-26 Hammer, The--How to Drive a Nail
Source: Walden Film Corporation, 39 East 31st Street, New York, New York 10016. 4 minutes--color (cartridge N/S).

A-27 Measuring Tools--Common Types
Source: Visual Instruction Productions, 295 West 4th Street, New York, New York 10016. 2 minutes--color (cartridge N/S).

A-30 Woodworking--Hand Tools--A Series
Source: Sterling Educational Films, P.O. Box 8497, Universal City, Los Angeles, California 19608. Produced in 1968.
Consists of the following:

1. Backsaws
2. Bit brace and bits
3. Block plane
4. Butts--joints
5. Cabinet scraper
6. Care and sharpening
7. Clamps
8. Compasses, dividers, and trammel points
9. Construction of common planes
10. Coping and compass saws
11. Correct use of hammer
12. Correct use of nails
13. Cross cut saw
14. Dado and groove joints
15. Dowel joints
16. Drilling holes
17. Flat blade, screwdriver
18. Gauges
19. Glueing
20. Grinder
21. Half-lap joints
22. Hammer handles and faces
23. Hand drills
24. Hand scraper
25. Jack plane
26. Lacquer
27. Layout with the try square
28. Nails
29. Natural glue
30. Oilstone, the
31. Phillips screwdriver
32. Preparing wood surfaces
33. Rabbet joints
34. Rabbet and router planes

A-30 Woodworking--Hand Tools--A Series (continued)

35. Resin glues and contact cement
36. Rip saw
37. Rules and Tapes
38. Safety with the chisel
39. Sandpapers and sanding
40. Selecting a hammer
41. Sharpening a chisel
42. Sharpening a plane iron
43. Sharpening gauges
44. Sharpening scrapers
45. Shellac
46. Smoothing and joiner planes
47. Socket screwdriver
48. Special purpose screwdriver
49. Squares
50. Stains
51. Tyes of chisels
52. Using a chisel, pt. I
53. Using a chisel, pt. II
54. Using clamps
55. Using the Auger bit
56. Using the expansive bit and depth gauge
57. Using the gauge
58. Varnish
59. Wax and oil
60. Wood screws

A-31 Woodworking--Hand Tool Operation, Set 2--A Series

Source: McGraw-Hill Textfilms, 330 West 42nd.Street, New York New York, 10036. 4 minutes.

Consists of the following:

1. Boring with Auger bit
2. Boring with Forstner bit
3. Chiseling to fini.hed line
4. Compass saw
5. Drilling
6. Filing Wood
7. Glueing edge to edge
8. Methods of planing end grain
9. Planning a chamfer
10. Scraping wood
11. Setting a plane
12. Squaring up stock
13. Using a gauge
14. Using spoke shine

A-32 Woodworking Tools--A Series

Source: Bailey Film Associates, 11559 Santa Monica Boulevard Los Angeles, California 10025. 4 minutes.

Consists of the following:

1. Chisels, rasps, and clamps
2. Hammers--woodwork

REFERENCES FOR INSTRUCTIONAL AIDS (continued)

35 mm. Filmstrips

B-1 Building the Foundation
Source: Eye Gate House, 146-01 Archer Avenue, Jamaica, New York 11435. 25 frames--color.

B-2 Building the Foundation
Source: Society for Visual Education, Incorporated, 1345 Diversay Parkway, Chicago, Illinois 60614. 30 frames--color.

B-3 Building the Frame House
Source: Eye Gate House, 146-01 Archer Avenue, Jamaica, New York 11435. 25 frames--color.

B-4 Building the Shell
Source: Society for Visual Education, Incorporated, Division of General Precision Equipment Corporation, 1345 Diversay Parkway, Chicago, Illinois 60614. 33 frames--color.

B-5 Hand Saws for Woodworking--A Series
Source: Encyclopedia Britannica Films, Educational Films Corporation, 425 North Michigan Ave., Chicago, Illinois 60611--Produced in 1960.
Consists of the following titles:
Crosscut Saw and Ripsaw 20 frames
How to Sharpen Hand Saws 14 frames
How to use Backsaw and Dovetail Saw 12 frames
How to use Compass and Keyhole Saw 10 frames
How to use Coping Saw and the Turning Saw 14 frames
How to use the Crosscut and Ripsaw 10 frames
How to use the Miter Box 24 frames
How to use the Picture Framing Miter Machine 14 frames
Types of Hand Saws 10 frames

B-6 Hand Tools 78 frames--B/W
Hand Tools, Hammers, Saws 67 frames--B/W
Source: Jim Handy Organization, 2821 East Grand Boulevard, Detroit, Michigan 48211.

B-7 Hand Drill--A Series
Source: Bailey Films Association, 11559 Santa Monica Boulevard, Los Angeles, California 90025. 53 frames--color.
Consists of the following titles:
How to Select a Screwdriver
How to use Hammers and Nail Sets
How to use the Screwdriver
Information about Hammers and Nail Sets
Nails
Preparation for Driving Screws
Wood Screws

Transparencies

C-1 Carpentry--Roof Framing, Part 2, catalogue #399
Source: Minnesota Mining and Manufacturing Company, Film Library, 2501 Hudson Road, St. Paul, Minnesota 55119.

C-2 Carpentry--Staircase Construction, catalogue #400
Source: Minnesota Mining and Manufacturing Company, Film Library, 2501 Hudson Road, St. Paul, Minnesota 55119.

C-3 Carpentry--Interior Trim, catalogue #401
Source: Minnesota Mining and Manufacturing Company, Film Library, 2501 Hudson Road, St. Paul, Minnesota 55119.

C-4 Carpentry--Exterior Trim, catalogue #402
Source: Minnesota Mining and Manufacturing Company, Film Library, 2501 Hudson Road, St. Paul, Minnesota 55119.

C-5 Coping and Compass Saws
Source: Minnesota Mining and Manufacturing Company, Film Library, 2501 Hudson Road, St. Paul, Minnesota 55119.

C-6 Cornice Construction Details
Source: DCA Educational Products, Incorporated, Subs. of Display Corporation of America, 4865 Stenton Avenue, Philadelphia, Pennsylvania 19144.

C-7 Framing Elevations
Framing Plans (Floor)
Framing Plans and Details (Roof)
Source: DCA Educational Products, Incorporated, Subs. of Display Corporation of America, 4865 Stenton Avenue, Philadelphia, Pennsylvania 19144.

C-8 House Framing--Part 1, catalogue #390
Source: Minnesota Mining and Manufacturing Company, Film

C-9 House Framing--Part II, catalogue #391
Source: Minnesota Mining and Manufacturing Company, Film Library, 2501 Hudson Road, St. Paul, Minnesota 55119.

C-10 Hand Tools and Machines in the Workshop--A Series
Source: Minnesota Mining and Manufacturing Company, Film Library, 2501 Hudson Road, St. Paul, Minnesota 55119

C-11 Roof Framing, catalogue #392
Source: Minnesota Mining and Manufacturing Company, Film Library, 2501 Hudson Road, St. Paul, Minnesota 55119.

D-Film Loops

REFERENCES FOR INSTRUCTIONAL AIDS (continued)

Books

E-1 Accident Prevention Manual for Shop Teachers
Williams, William A.
American Technical Society
Chicago, Illinois 60637

E-2 Builders Encyclopedia
Ulrey, Harry F.
Howard W. Sams & Company, Incorporated
4300 West 62nd Street
Indianapolis, Indiana 46268

E-3 Cabinet Making and Millwork, Tools, Materials, Layout Construction 2nd. edition
Dahl, Alf; Wilson, Douglas
American Technical Society
Chicago, Illinois 60637

E-4 Carpentry, Blueprint Reading & Sketching--Residential
McDonnell, Leo P.
Delmar Publishers
P.O. Box 5087
Albany, New York 12205

E-5 Carpenters and Builders Library, 4 volumes
Ulrey, Harry F.
Howard W. Sams & Company, Incorporated
4300 West 62nd. Street
Indianapolis, Indiana 46268
Volume I. Contents:
Carpentry hand tools, woodworking machines, use of the steel square, cabinetmaking joints and patternmaking.
Volume II Contents:
Carpenters mathematics, surveying, strength of wood, architechtural plans and specification, metal construction.
Volume III Contents:
Plot layout, foundations, concrete forms and block construction, house framing, chimneys, fireplaces, scaffolding and building insulation.
Volume IV Contents:
Roofing, cornice construction, millwork, doors, windows, and siding, flooring, interior walls and ceiling, painting and maintenance.

E-6 Carpentry and Building
Ulrey, Harry F.
Howard W. Sams & Company, Incorporated
4300 West 62nd Street
Indianapolis, Indiana 46268

E-7 Carpentry for the Building Trades, 2nd. edition
Lair, Elbert A.
McGraw-Hill Incorporated
330 West 42nd. Street
New York, New York 10036

E-8 Carpentry
Cristoford, R.J.
Arco Publishing Company, Incorporated
219 Park Avenue, South
New York, New York 10003

E-9 Concrete Form Construction
Delmar Publishers
P.O. Box 5087
Albany, New York 12205

E-10 Concrete Construction Handbook
Waddell, Joseph D.
McGraw-Hill Incorporated
330 West 42nd Street
New York New York 10036

E-11 Construction Estimating
Jones, R.
Delmar Publishers
P.O. Box 5087
Albany, New York 12205

E-12 Construction Estimating and Costs, 4th edition
Pulver, E. Harry
McGraw-Hill Incorporated
330 West 42nd Street
New York, New York 10036

E-13 Construction Estimates from Take-off to Bids
Foster, Norman
McGraw-Hill Incorporated
330 West 42nd Street
New York, New York 10036

E-14 Construction Estimating and Job Preplanning
Deatherage, George E.
McGraw-Hill Incorporated
330 West 42nd Street
New York, New York 10036

E-15 Carpentered Hen
Updike, John
Harper & Row Publishers Incorporated
49 East 33rd Street
New York, New York 10016

E-16 Carpentry and Joinery
Douglas, W.B.
P. Shalon Publications Incorporated
5409 18th Avenue
Brooklyn, New York 11204

E-17 Carpenters Tools, Their Care and Maintenance
Drake Publishers
381 Park Avenue, South
New York, New York 10016

E-18 Carpenters, U.S. Safety
McElroy, Shafer, Frank; and McCormach, George R.
U.S. Bureau of Labor Statistics Bulletin #1118
Washington, D.C.

E-19 Design and Production of Houses
Kelly, Burnham
McGraw-Hill Incorporated
330 West 42nd Street
New York, New York 10036

E-20 Design of Concrete Structures
Urquhart, George; O'Rourke, L.C.
McGraw-Hill Incorporated
330 West 42nd Street
New York, New York 10036

E-21 Design of Foundations for Buildings
Johnson, Sidney M.; Kavanagh, Thomas C.
McGraw-Hill Incorporated
330 West 42nd Street
New York, New York 10036

E-22 Design of Prestressed Concrete Beams
Connolly, W.H.
McGraw-Hill Incorporated
330 West 42nd Street
New York, New York 10036

E-23 Estimating for the Building Trades
Steinburg, Joseph; Stempel, Martin
American Technical Society
Chicago, Illinois 60637

E-24 Foundation Construction
Carson, Arthur B.
McGraw-Hill Incorporated
330 West 42nd Street
New York, New York 10036

E-25 Framing, Sheathing, and Insulation
Jones, R.
Delmar Publishers
P.O. Box 5087
Albany, New York 12205

E-26 Fundamentals of Carpentry Tools, Materials, Practices, 4th edition
Durbahn, Walter E.; Sunberg, Elmer W.
American Technical Society
Chicago, Illinois 60637

E-27 Fundamentals of Carpentry Practical Construction, 4th edition
Durbahn, Walter E.; Sunberg, Elmer W.
American Technical Society
Chicago, Illinois 60637

E-28 Interior and Exterior Trim
Delmar Publishers
P.O. Box 5087
Albany, New York 12205

E-29 Modern Carpentry
Wagner, Willis H.
Goodheart-Willcox
123 West Taft Drive
South Holland, Illinois 60473

E-30 Principles and Practices of Learning Construction
Smith, Ronald C.
Prentice-Hall, Incorporated
680 Forest Road, Northeast
Atlanta, Georgia 30312

E-31 Practical House Carpentry, Methods for Building
Wilson, J.D.
McGraw- Hill Incorporated
330 West 42nd Street
New York, New York 10036

E-32 Practical Problems in Math Carpentry Trade
Wilson, J.D.
Delmar Publishers
P.O. Box 5087
Albany, New York 12205

E-33 Principles of Light Construction
Smith, Roland C.
Prentice-Hall, Incorporated
680 Forest Road Northeast
Atlanta, Georgia 30312

E-34 Related Mathematics for Carpenters
Chamberlain
American Technical Society
Chicago, Illinois 60637

E-35 Simplified Roof Framing, 2nd edition
Wilson, J.D.; Werner, S.O.
McGraw-Hill Incorporated
330 West 42nd Street
New York, New York 10036

E-36 Simplified Stair Layout
Wilson, J.D.; Werner, S.O.
Delmar Publishers
P.O. 5087
Albany, New York 11205

E-37 Stair Layout Design and Building
Bradzinski, Stanley, Jr.
American Technical Society
Chicago, Illinois 60637

E-38 Steel Square, 2nd edition
Townsend, Gilbert
American Technical Society
Chicago, Illinois 60637

E-39 The Steel Square
Seigele, H.H.
Drake Publishers
381 Park Avenue, South
New York, New York 10016

REFERENCES FOR INSTRUMENTAL AIDS (continued)

E-40 The Use of Hand Woodworking Tools
McDonnell, Leo P.
Delmar Publishers
P.O. Box 5087
Albany, New York 12205

E-41 Use of Portable Power Tools
McDonnell, Leo P.
Delmar Publishers
P.O. Box 5087
Albany, New York 12205

F-Flip Charts

G-Workbooks

Pamphlets and Curriculum Guides

H-1 Alabama Department of Education Curriculum Guide
Includes bibliographies--Ed. Lab.

H-2 Rules and Regulations Governing Construction and Demolition and All Excavation
Commonwealth of Virginia. Virginia Department of Labor and Industry

H-3 Minimum Property Standards for One and Two Living Units
Federal Housing Administration

H-4 Safety Rules for the safe operation of power woodworking tools
45 Samworth Road, Clifton, New Jersey 07012

REFERENCES FOR INSTRUCTIONAL AIDS (continued)

I-Handout Sheets

The following section contains handout sheets which may be used to distribute information to students. These sheets have not been listed as instructional aids in the units of instruction section; however, the teacher may find some of these handouts appropriate for use as instructional aids. Contained herein are only a few of a large number of handout sheets which may be prepared by the teacher. In addition to being used as handout sheets, the following materials may be utilized for making transpariences to be projected on the screen.

GENERAL SAFETY RULES

1. Wear goggles when operating any machine.
2. No neckties are to be worn around a machine.
3. Unplug the electrical outlet when adjusting or carrying power hand tools.
4. Check to be sure electrical outlet is properly grounded.
5. Check voltage of electrical equipment before connecting to make sure the right outlet is used.
6. Do not place tools or equipment where someone may fall over them.
7. Always draw nails from scrap wood before discarding.
8. Practice good house-keeping.
9. Under no condition should "horse-play" be practiced.
10. Do not place tools on anything over head height.

GENERAL SHOP SAFETY RULES

In addition to any specific safety practices, the student will comply with the following general safety rules. The student will be given instruction on these rules at the beginning of the school year and they must be followed at all times while in the shop area. If the instructor will seek to foster a good safety attitude in students, enforcement should not be difficult.

1. No horse play at anytime.
2. Whistling or any unnecessary noises are not permitted.
3. A safe, helpful attitude toward others should be practiced.
4. Student will not start work until appropriately dressed.
5. Eye Protective Devices must be worn in compliance with Virginia State law.
6. Student will enter and leave the shop in orderly manner.
7. Accidents of any nature will be reported at once to the instructor.
8. Report any defective equipment to the instructor immediately.
9. Safety hazards must be reported to the instructor.
10. No student will operate any equipment until permission has been granted from the instructor.
11. All tools and materials must be in proper place when not in use.
12. All equipment and floor will be cleaned before leaving the shop.
13. No visitors are allowed in the shop without the instructor's permission.
14. Good housekeeping rules:
    a. All aisles and walkways kept free from materials.
    b. Scrap and rubbish kept in proper containers.
    c. All spills wiped immediately.
    d. Provide proper ventilation.
    e. Keep all work areas clean.
    f. Place all materials in proper racks or carefully laid pile.
    g. Keep all inflammable materials properly stored.

MACHINE SAFETY

1. No equipment will be used until student has had proper instructions, and has passed a safety test on said equipment.
2. Never operate equipment if overly tired, ill or taking medication which impairs ability.
3. Make adjustments while power is off, and machine is stopped.
4. Keep attention on work.
5. Never remove safety guards without permission or presence of the instructor.
6. Wear safety goggles.
7. Stand clear of machine when starting.
8. Do not overtax the equipment.
9. Never clean equipment when running.
10. Have equipment properly grounded.
11. Only one person may operate any equipment at one time.
12. Do not leave running equipment unattended.
13. When job is finished, do not leave machine until it has completely stopped.
14. Machine will not be operated when instructor is absent from the shop.
15. Proper clothing will be worn at all times.
16. Floors in machine area must be kept clean at all times.
17. Never work with machinery when alone.
18. Report any defective equipment.
19. All equipment must be checked by the instructor and student before operation.
20. Never overload an electrical circuit.

HAND TOOL SAFETY

1. Use the correct tool for the job at hand.
2. Tools must be clean and dry before use.
3. Defective or broken tools must be reported to the instructor.
4. Do not strike hardened steel together.
5. Mushroomed tools will not be used.
6. All tools must be sharp before use.
7. Carry tools in proper, safe manner.
8. Never throw a tool to another person.
9. Hold firmly onto all toools when using.
10. All tools will be stored in proper place after use.

ACKNOWLEDGMENT OF SAFETY INSTRUCTION AND PLEDGE

I have received the SAFETY INSTRUCTIONS regarding the operation of the following power driven machines. I fully understand the importance of these rules and regualtions and I am fully aware that the violation of any one of them may endanger myself and others.

My teacher has demonstrated to me the proper methods of using each machine listed below and has pointed out the safety precautions necessary to avoid injury.

I have demonstrated my ability to use each machine listed below in the presence of my teacher. I understand the safety precautions involved and understand how to insure my safety through the proper use of the machines. I am confident that I can operate these machines safely. When in doubt about the operation of any machine, or other equipment, I will consult the teacher before proceeding.

(Name each machine to be written in by the pupil only after he has passed the safety tests and demonstrated his ability to use it.)

Name of Machine	Date	Student's Signature	Teacher's Initials
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			

I have passed the tests covering safety in the shop and the use of the above listed machines.

I promise to observe the SAFETY INSTRUCTIONS and to follow the instructions given in the demonstration. I may use the machines only after I have been properly instructed in their safe use, and have had the approval of the teacher. I understand that the use of machines in this shop is voluntary on my part.

SCHOOL _____ SIGNED _____
Pupil

DATE _____
Teacher

PARENT OR GUARDIAN:

This form is being sent home for review and signature by the student's parent or guardian to allow you to see the progress of your youth. Upon return it will be placed in the student's Permanent Vocational Records for future reference and possible job placement.

Date _____
Parent or Guardian

ACCIDENT INSURANCE FORM

Yourtown Public Schools
Anywhere, Virginia

Office of Supervisor of
Industrial and Vocational Education Date_____

The Anywhere City School Board requires that all vocational shop students be covered by accident and hospitalization insurance because of the many accident possibilities associated with shop work. The special policy sold through the school is recommended. However, if the student is covered by another policy and the special school policy is not desired the following information must be filed with the school.

* *

I cerify that_____is covered by accident
(Student's Name)
and nospitalization insurance for the present school year with

_____ _____
(Name of Company) (Policy No.)

_____
(Parent's Signature)

_____
(Date)

(check one)
☐ School Jurisdictional
☐ Non-School Jurisdictional

RECOMMENDED STANDARD STUDENT ACCIDENT REPORT

(See instructions on reverse side)

(check one)
Recordable ☐
Reportable Only ☐

School District:
City, State:

General

1. Name	2. Address			
3. School	4. Sex Male ☐ Female ☐	5. Age	6. Grade/Special Program	
7. Time Accident Occurred Date:	Day of Week:	Exact Time:	AM ☐ PM ☐	

Injury

8. Nature of Injury

9. Part of Body Injured

10. Degree of Injury (check one)
Death ☐ Permanent ☐ Temporary (lost time) ☐ Non-Disabling (no lost time) ☐

11. Days Lost
From School: From Activities Other Than School. Total:

12. Cause of Injury

Accident

13. Accident Jurisdiction (check one)
School: Grounds ☐ Building ☐ To and From ☐ Other Activities Not on School Property ☐
Non-School: Home ☐ Other ☐

14. Location of Accident (be specific)	15. Activity of Person (be specific)
16. Status of Activity	17. Supervision (if yes, give title & name of supervisor) Yes ☐ No ☐
18. Agency Involved	19. Unsafe Act
20. Unsafe Mechanical/Physical Condition	21. Unsafe Personal Factor

22. Corrective Action Taken or Recommended

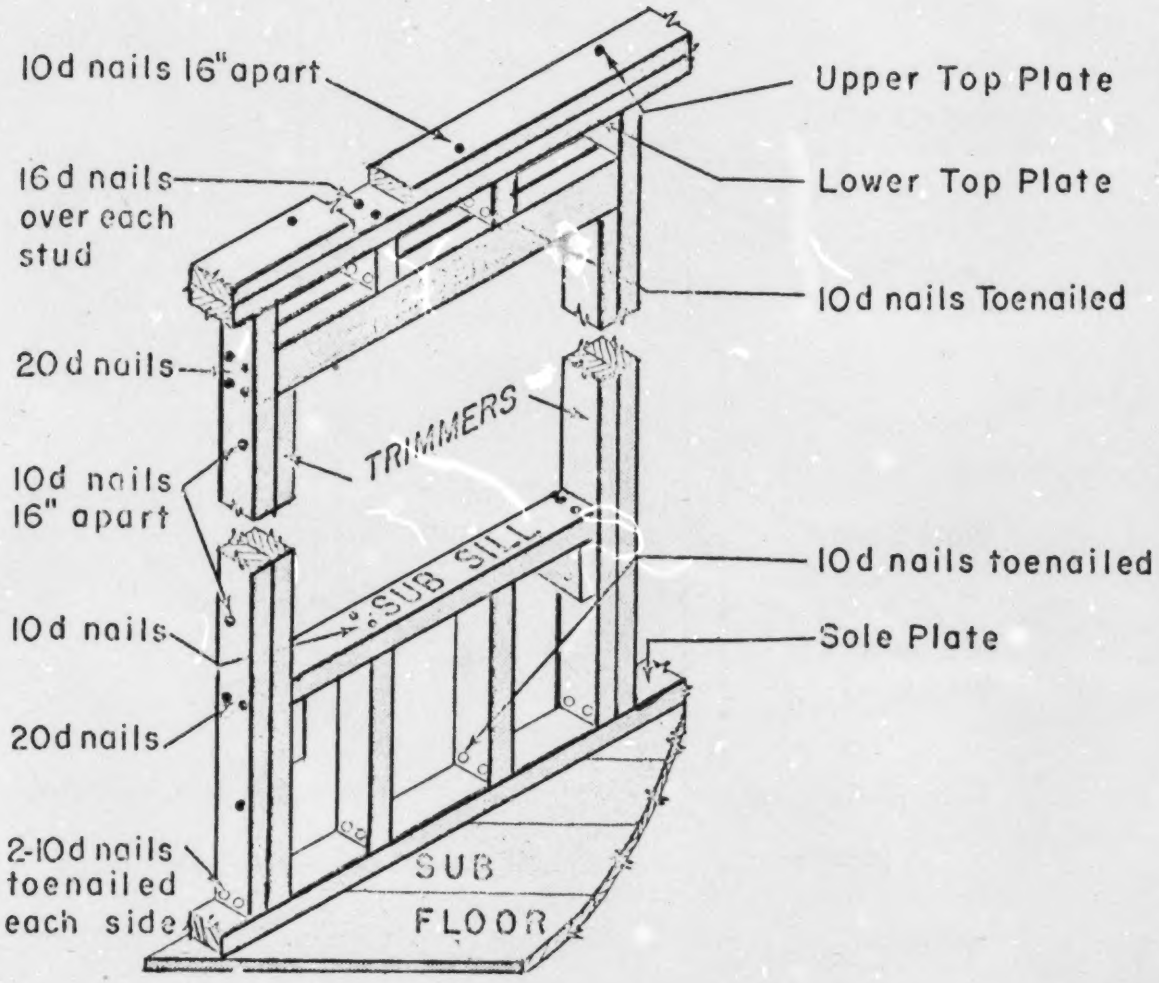
23. Property Damage
School $ Non-School $ Total $

24. Description (Give a word picture of the accident, explaining who, what, when, why and how)

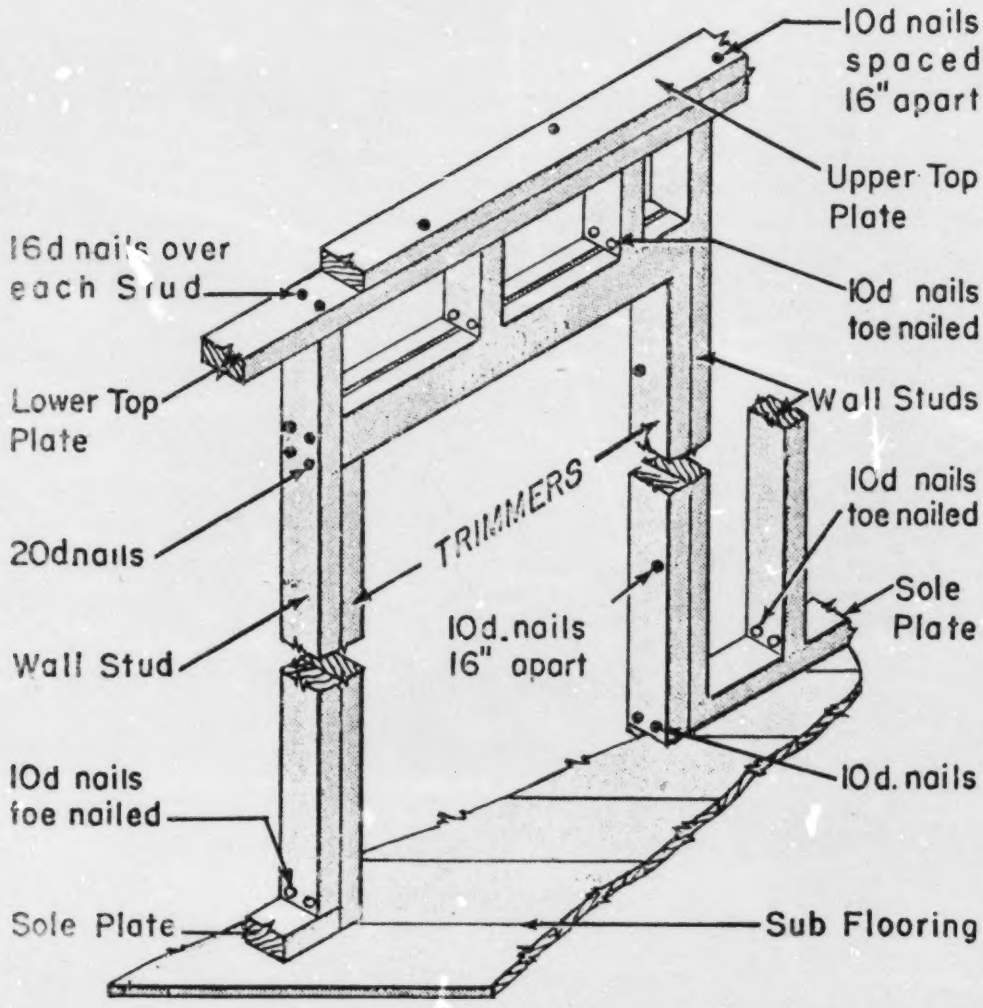
Signature

25. Date of Report	26. Report Prepared by (signature & title)
27. Principal's Signature	

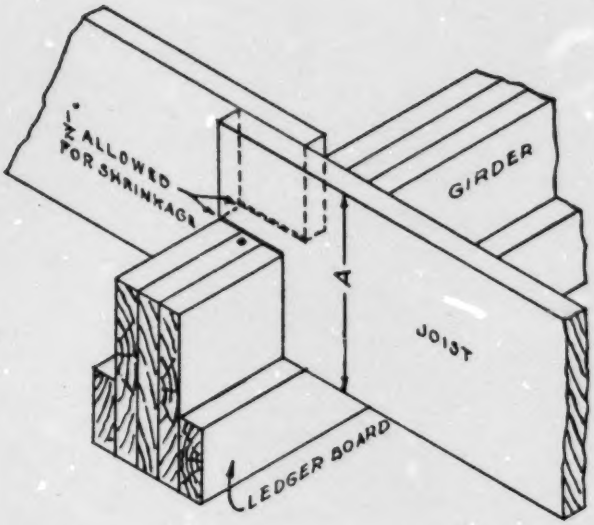
This form is recommended for securing data for accident prevention and safety education. School districts may reproduce this form adding space for optional data. Reference: *Student Accident Reporting Guidebook*, National Safety Council, 425 N. Michigan Avenue, Chicago, Illinois 60611. 1966. 34 pages.



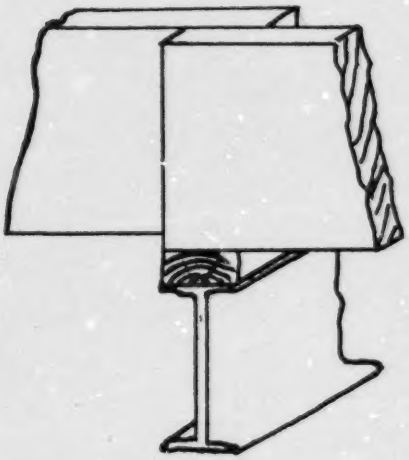
DETAIL OF
WINDOW NAILING



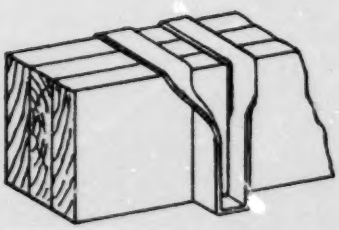
TYPICAL NAILING AT DOOR OPENINGS



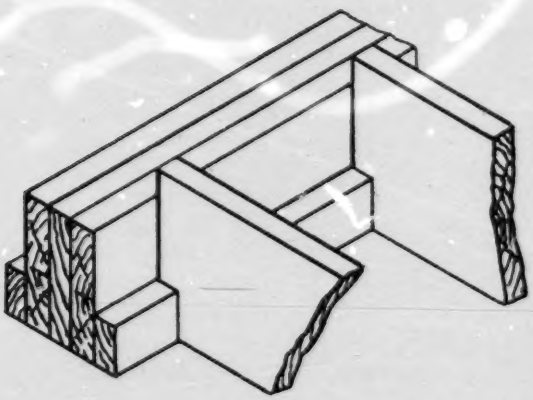
FRAMED JOIST AT GIRDER



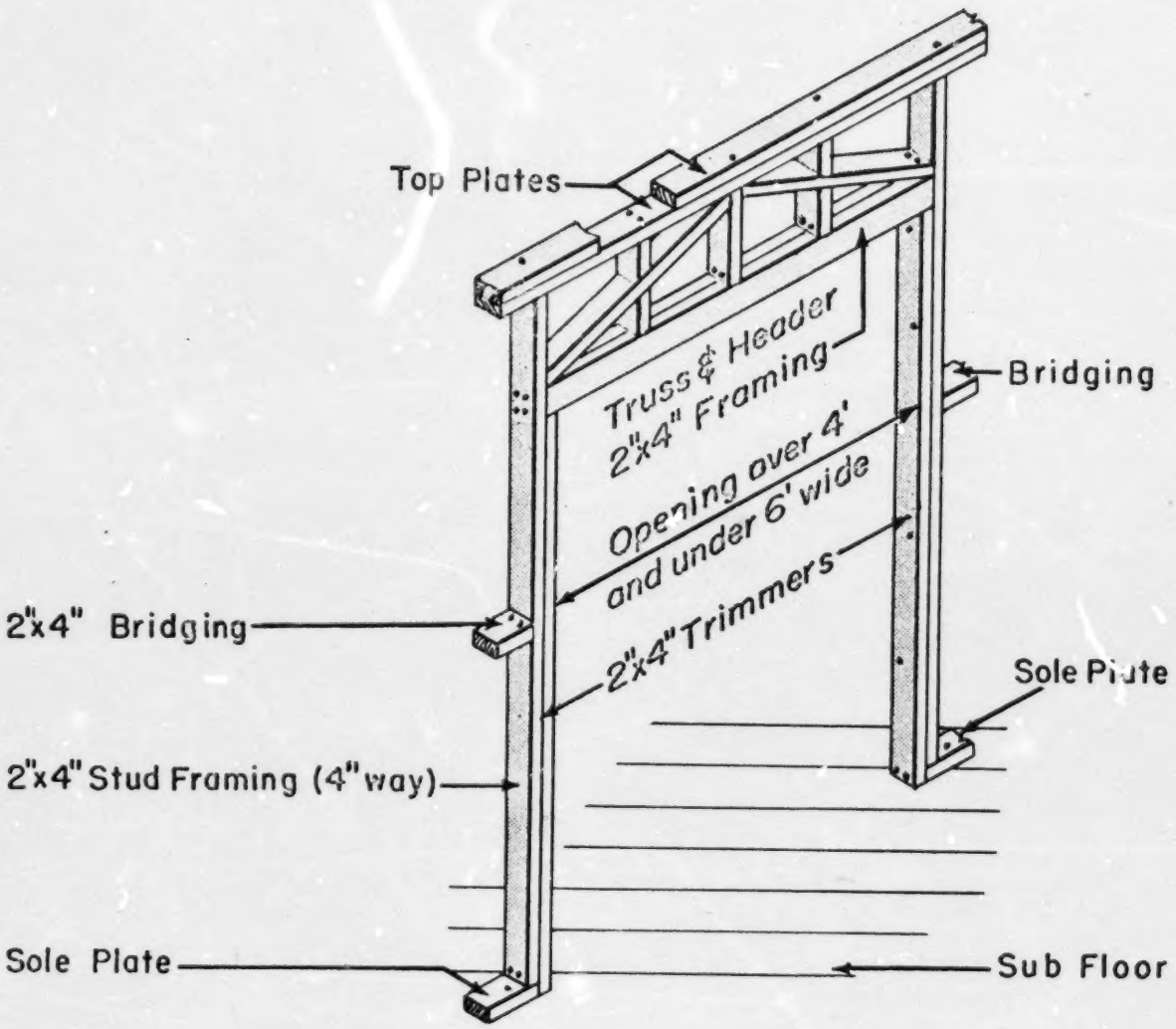
STEEL GIRDER



GIRDER WITH JOIST HANGER

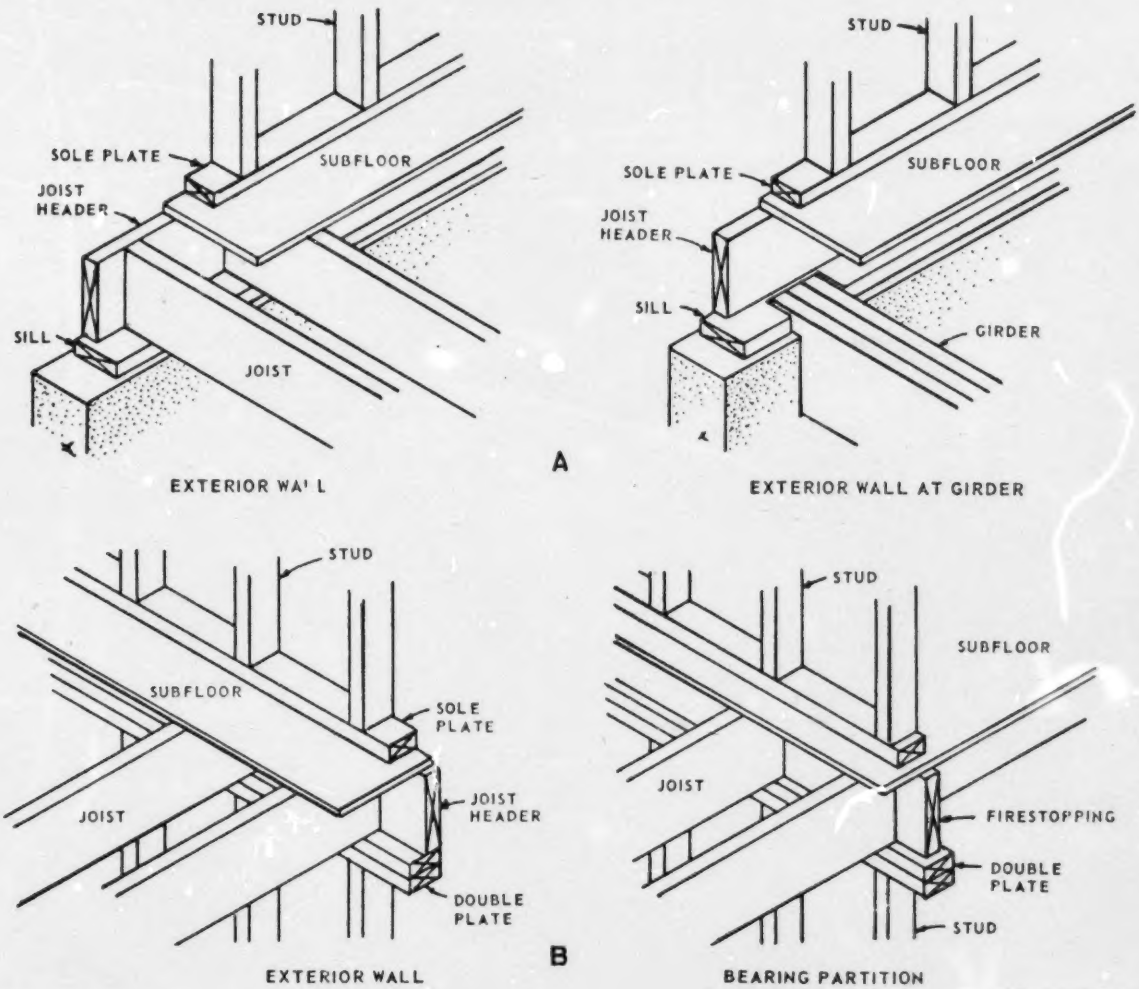


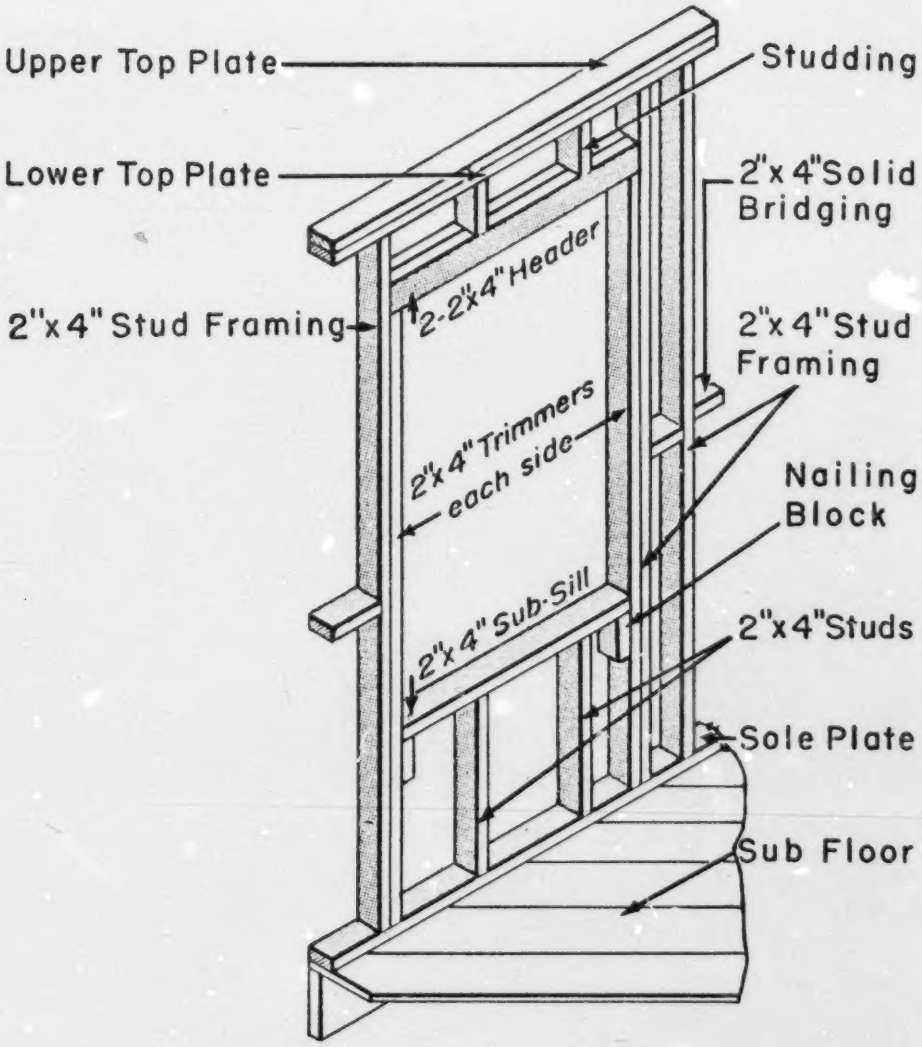
LEDGER BOARD ON GIRDER



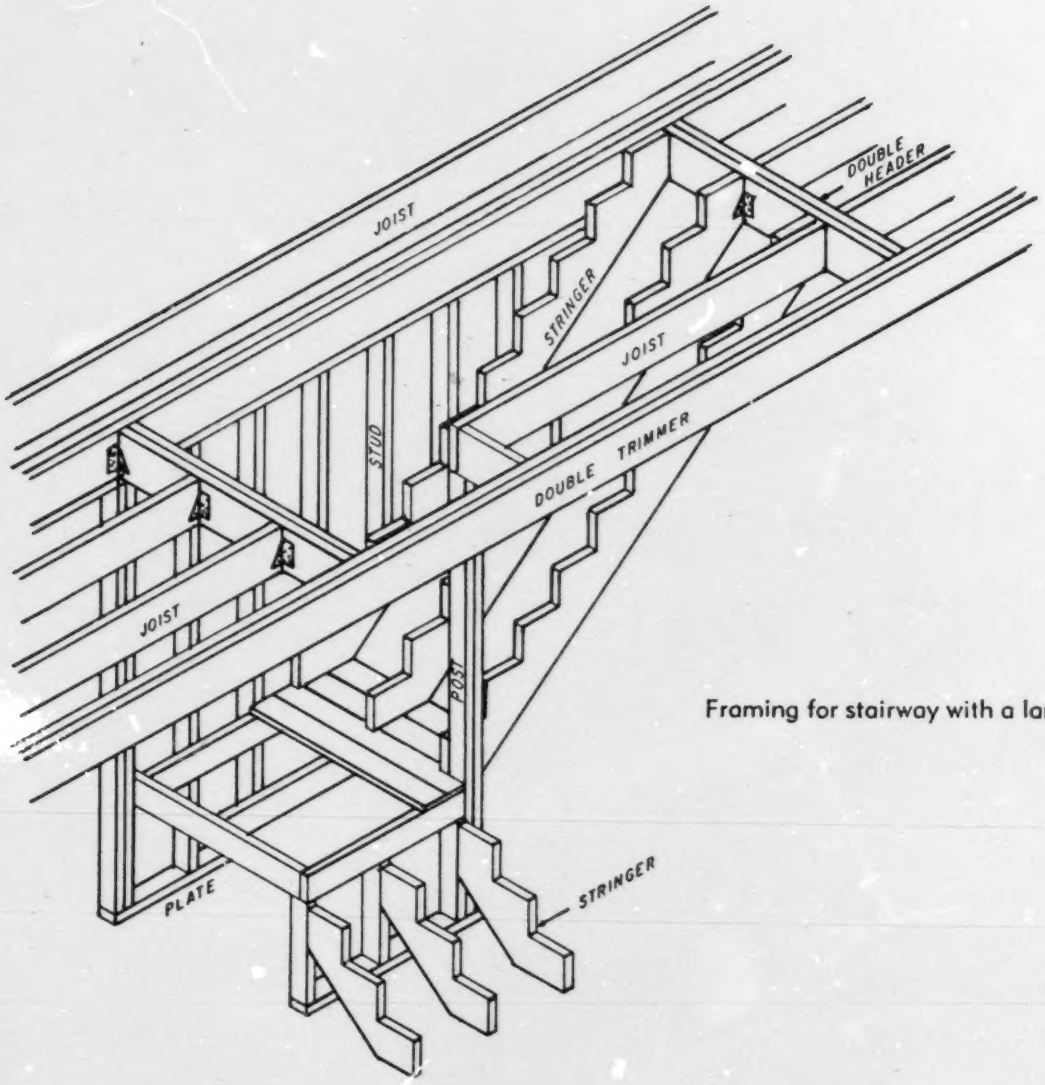
TRUSSED HEADER FRAMING
INTERIOR ARCH OPENING

Platform framing details: A–First floor level. B–Second floor level.

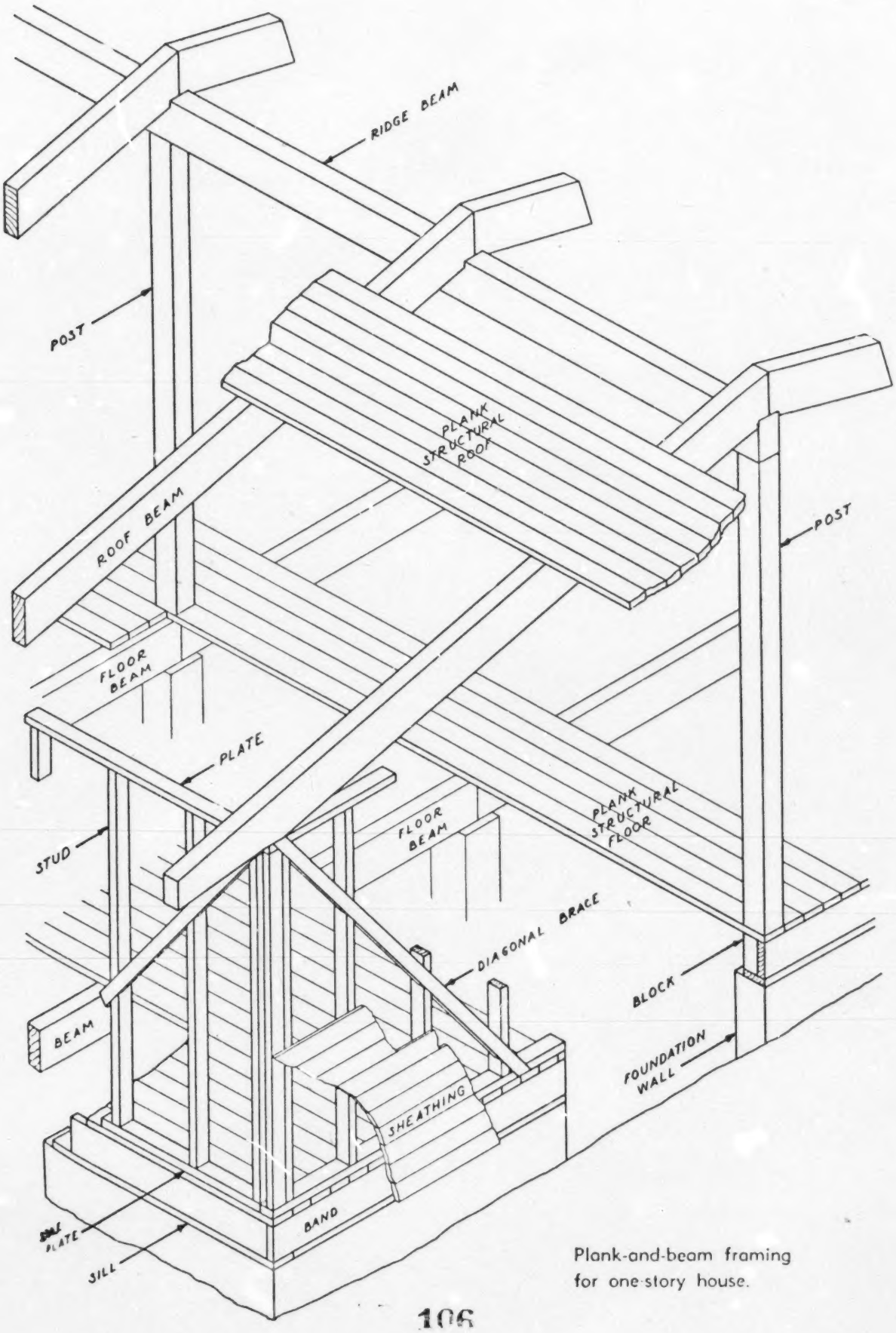




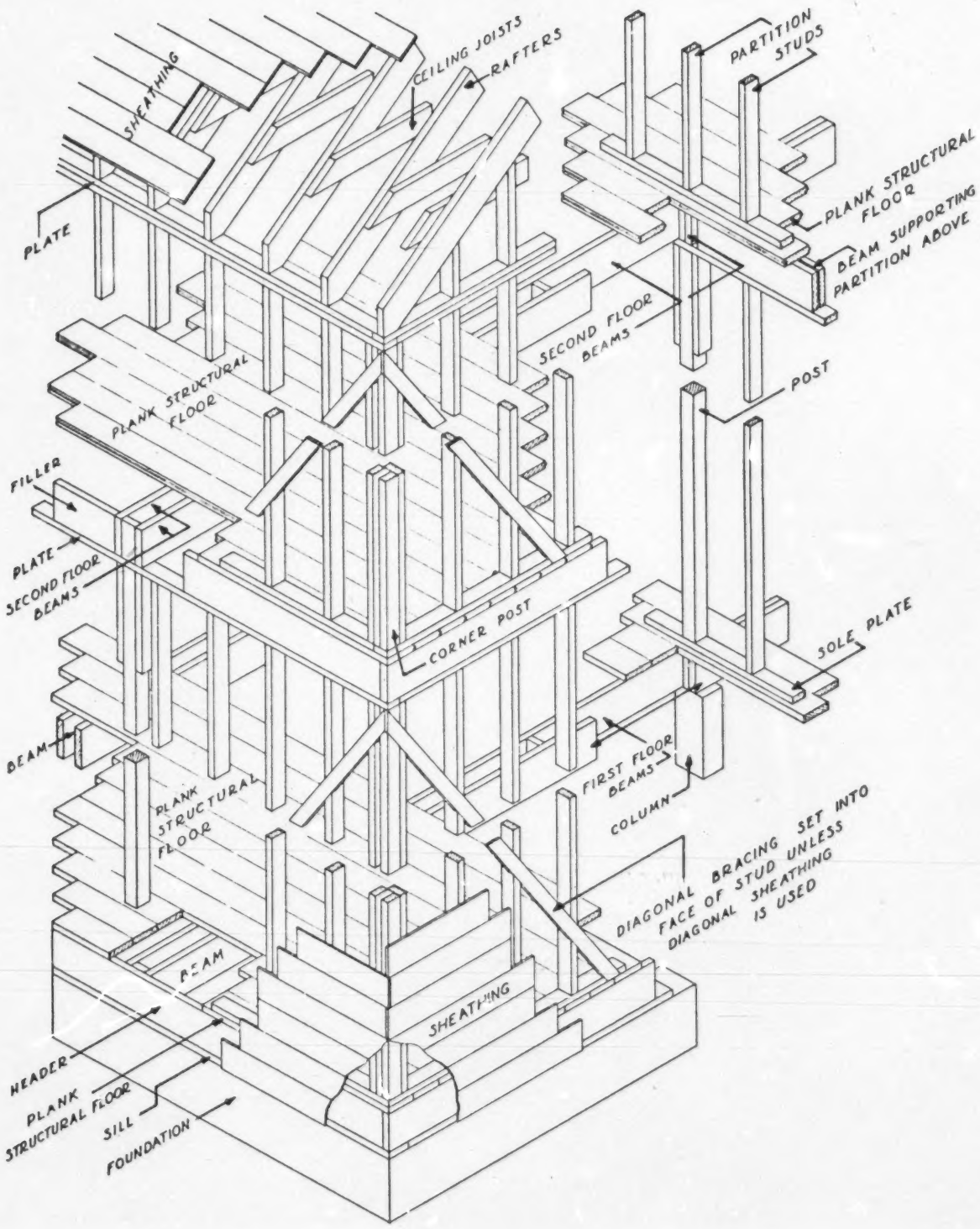
SINGLE UNIT WINDOW
OPENING IN FRAME WALL



Framing for stairway with a landing.

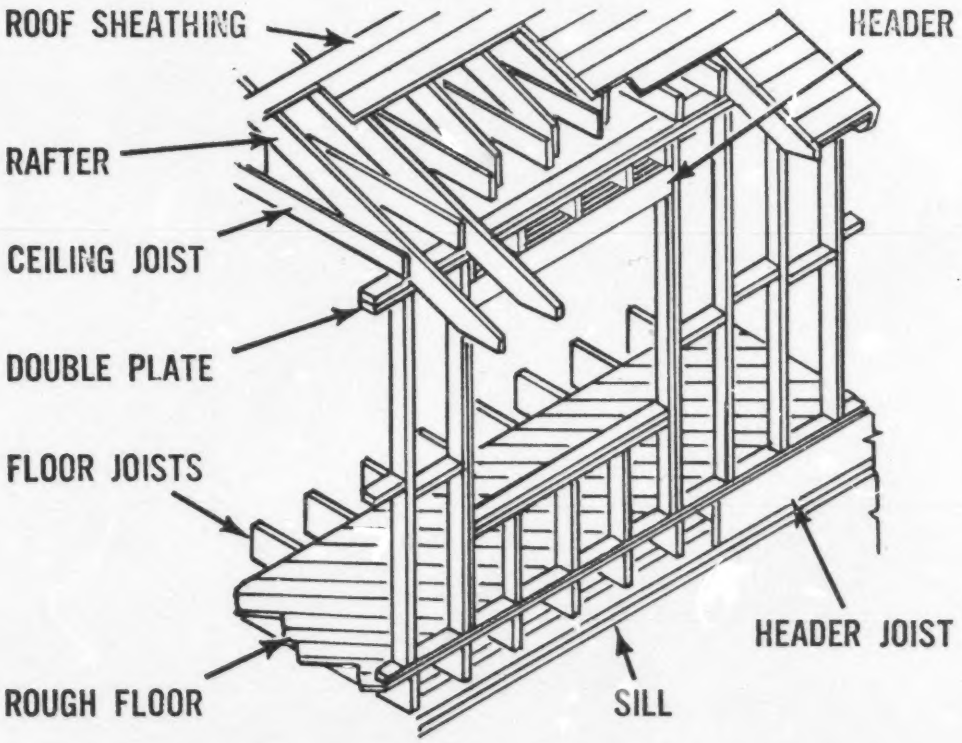


Plank-and-beam framing for one-story house.

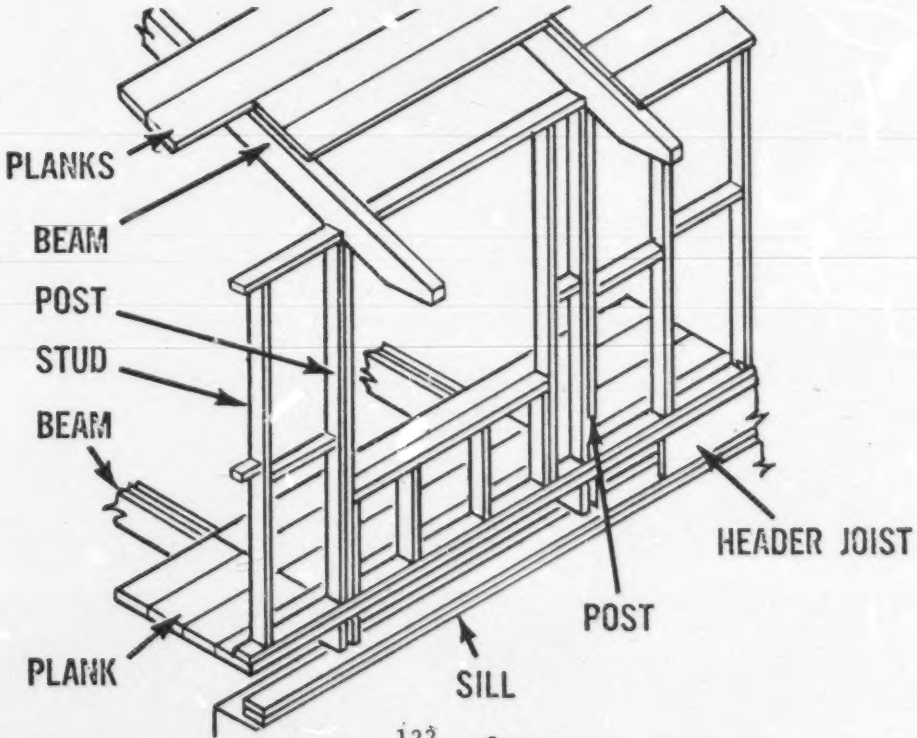


Plank-and-beam framing combined with conventional framing in two-story house.

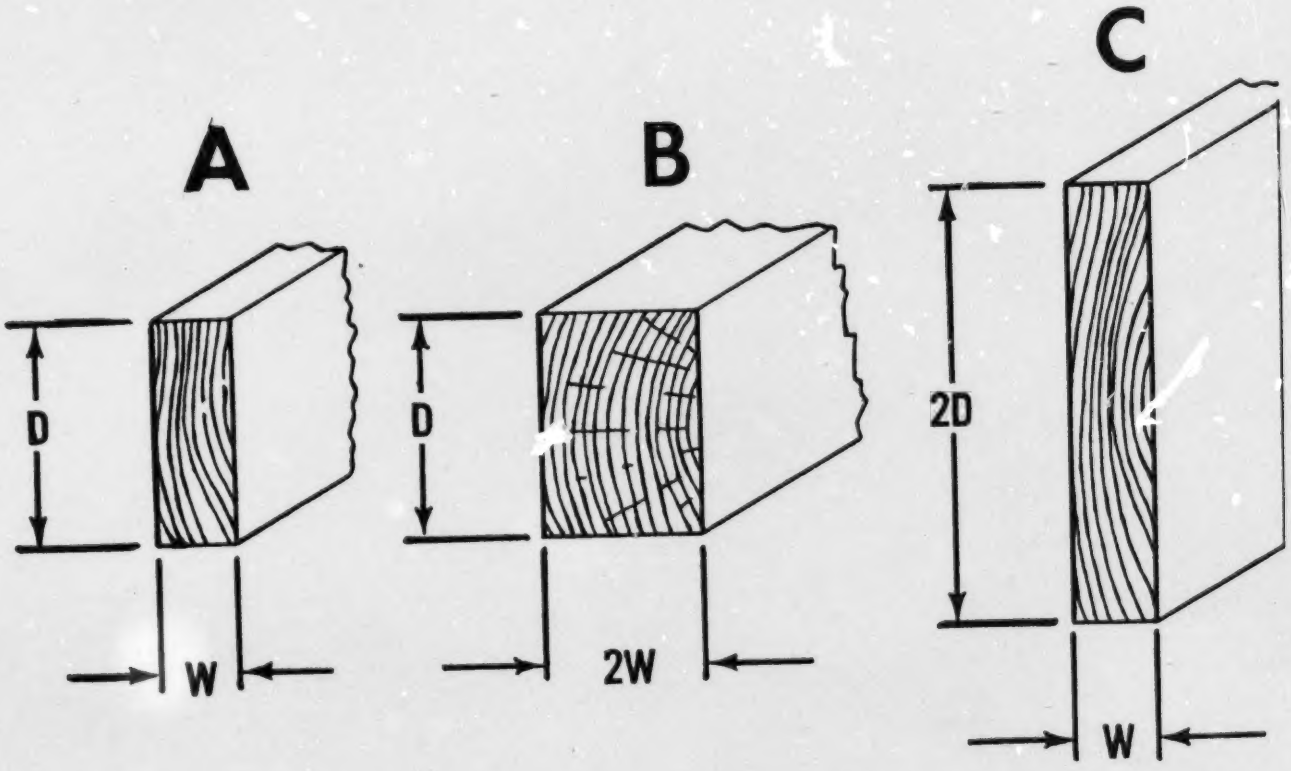
CONVENTIONAL FRAMING



PLANK-AND-BEAM FRAMING



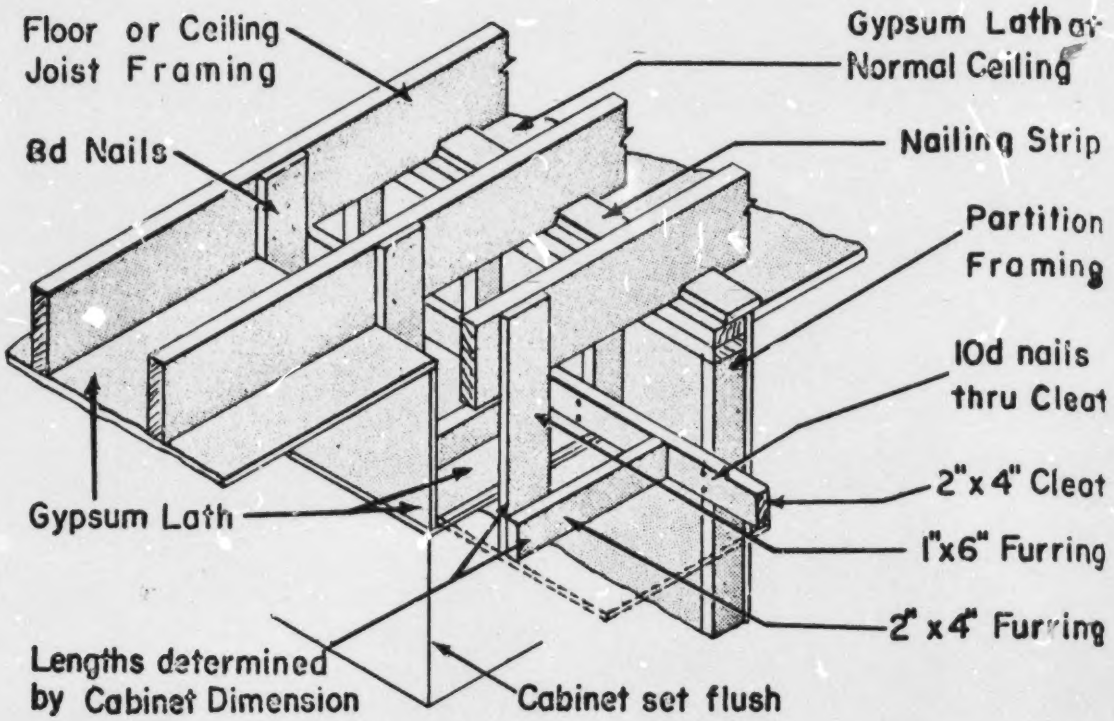
EFFECT OF INCREASED DIMENSIONS ON WOOD BEAM STRENGTH



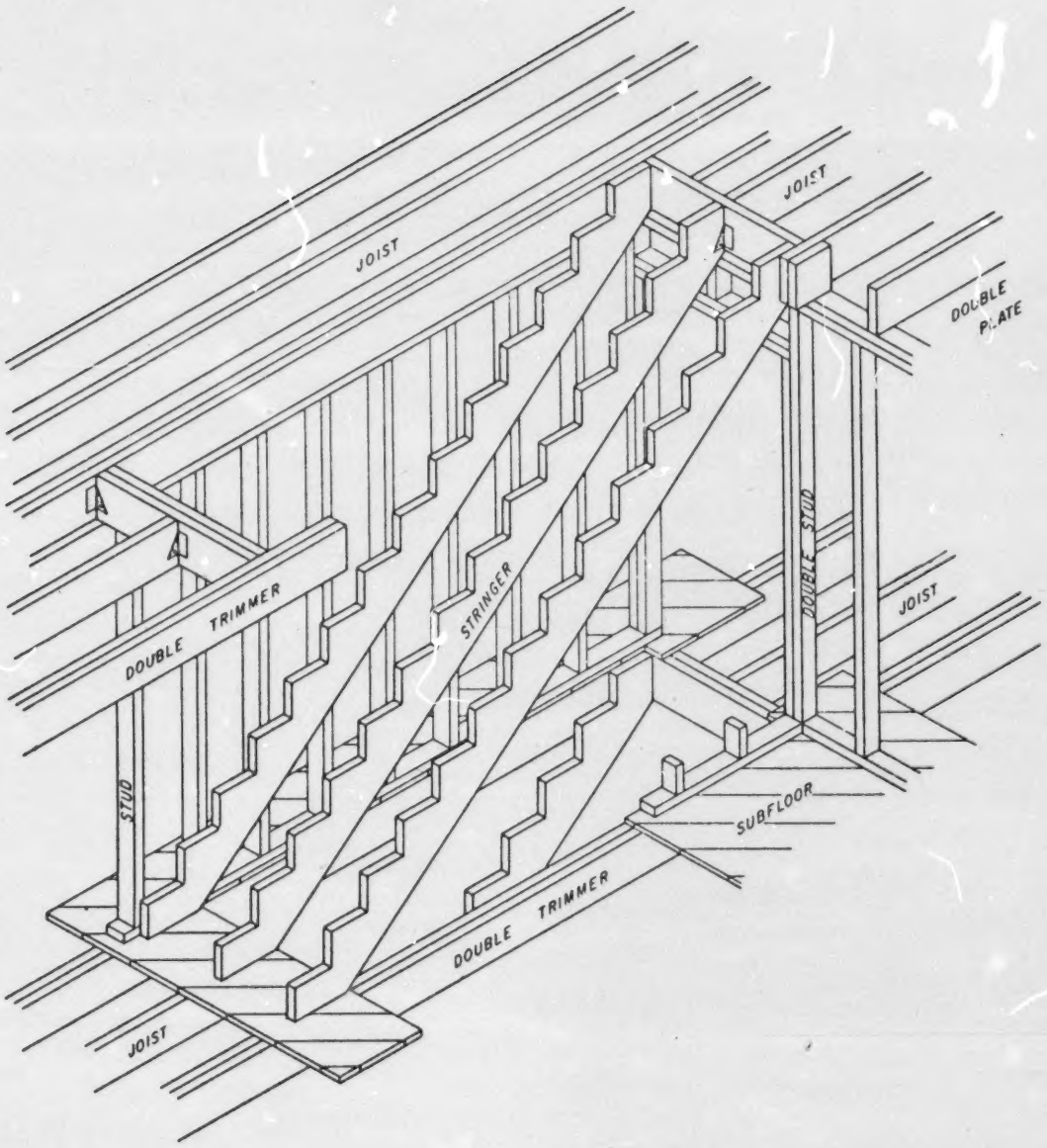
A. COMPARATIVE STRENGTH VALUE - 1

B. COMPARATIVE STRENGTH VALUE - 2

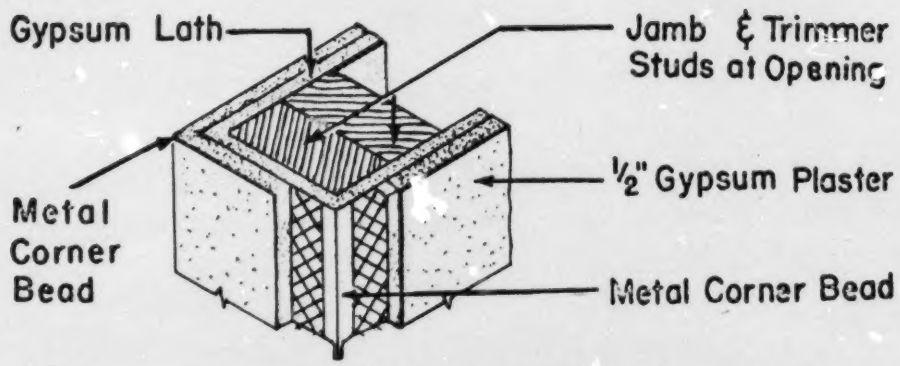
C. COMPARATIVE STRENGTH VALUE - 4



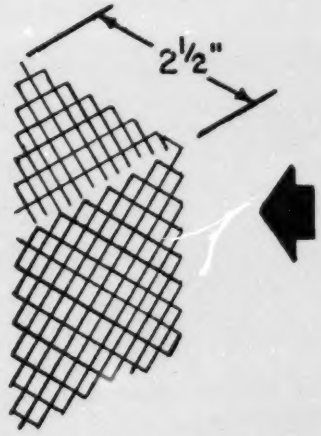
DROPPED CEILING
ABOVE
KITCHEN CABINETS



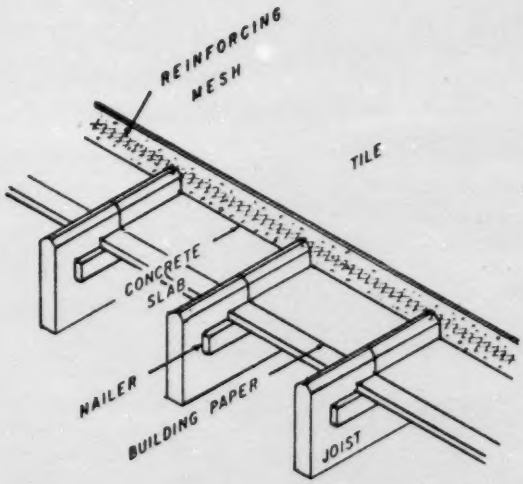
Interior stairway framing.



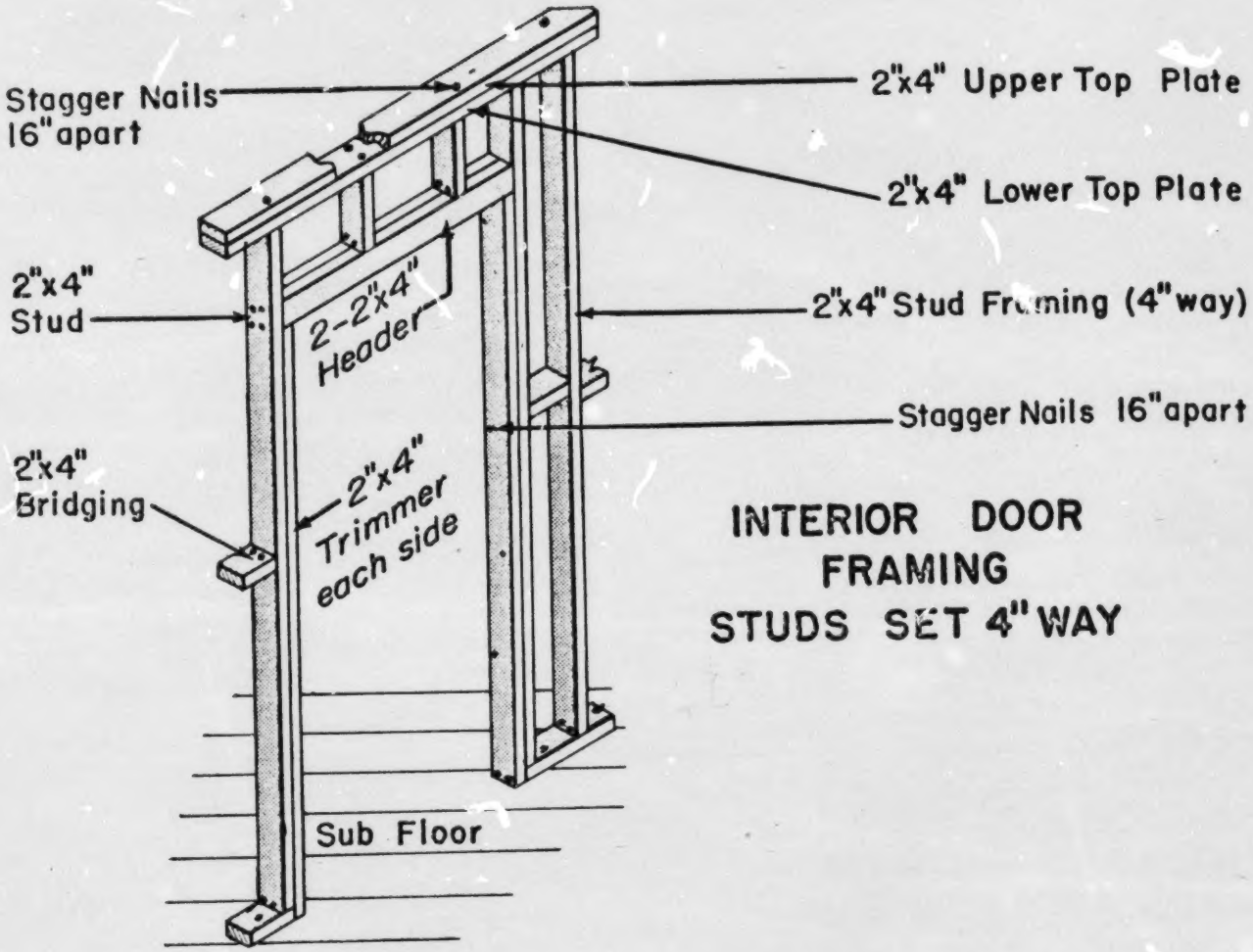
DETAIL AT PLASTERED OPENINGS



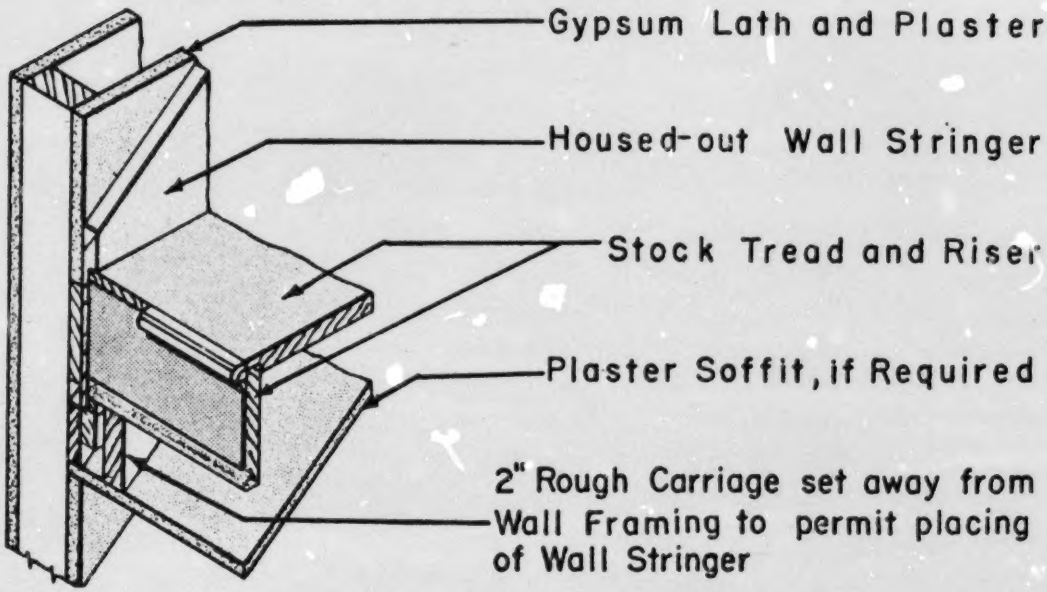
FORMED METAL LATH CORNER

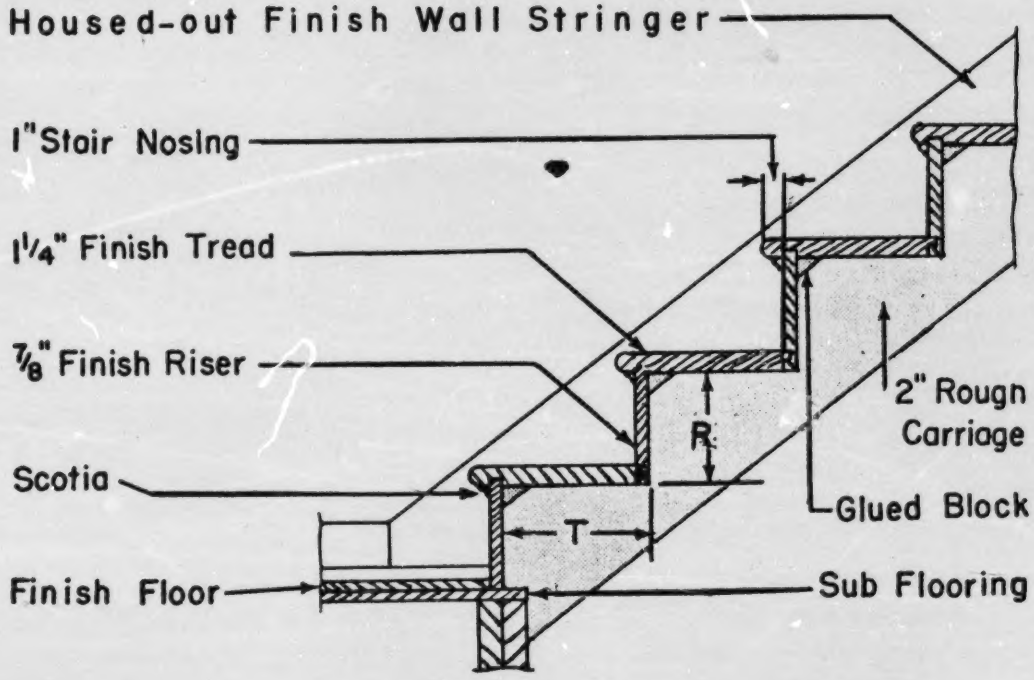


Bathroom floor construction. for ceramic tile covering.

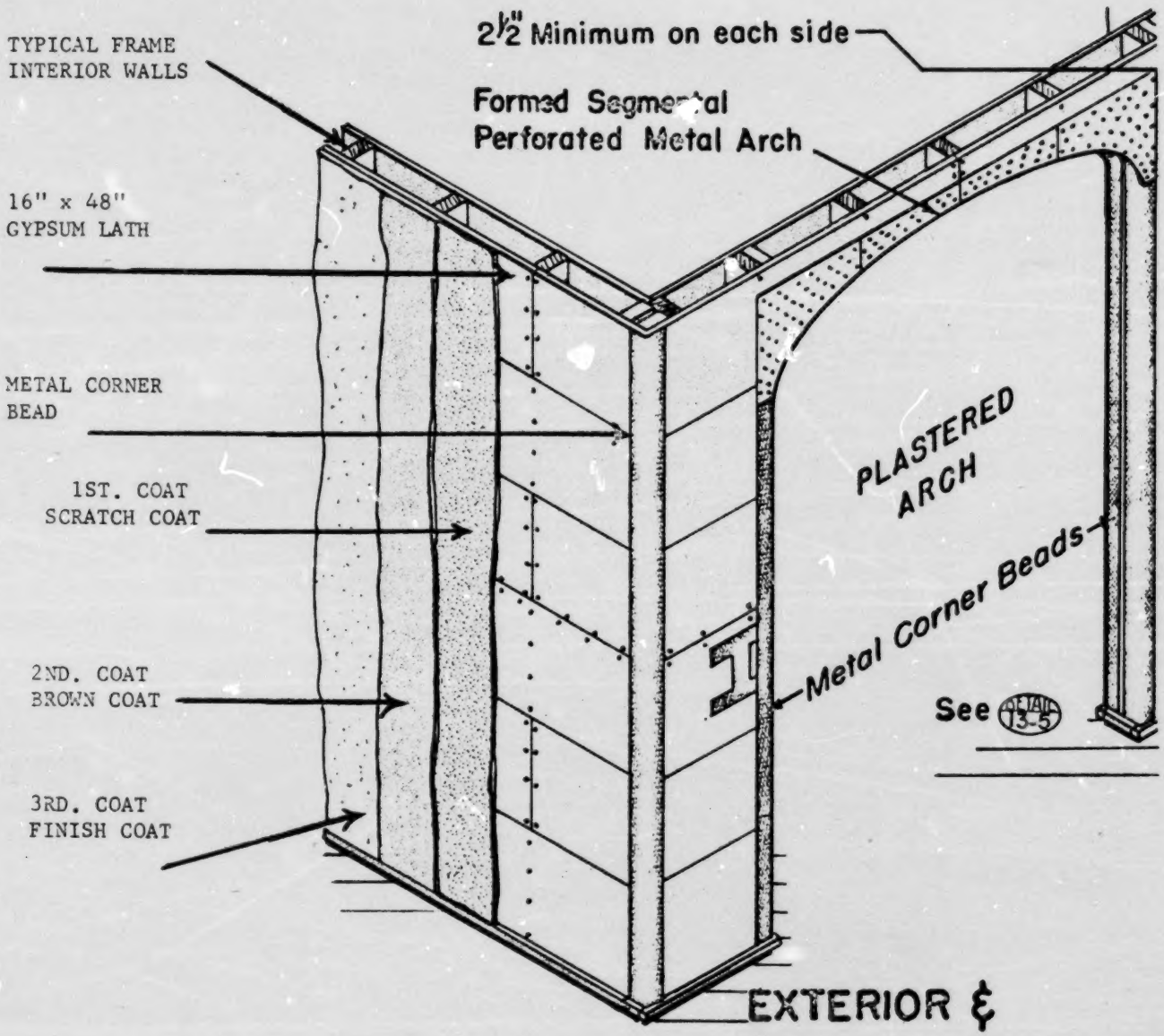


INTERIOR DOOR
FRAMING
STUDS SET 4" WAY

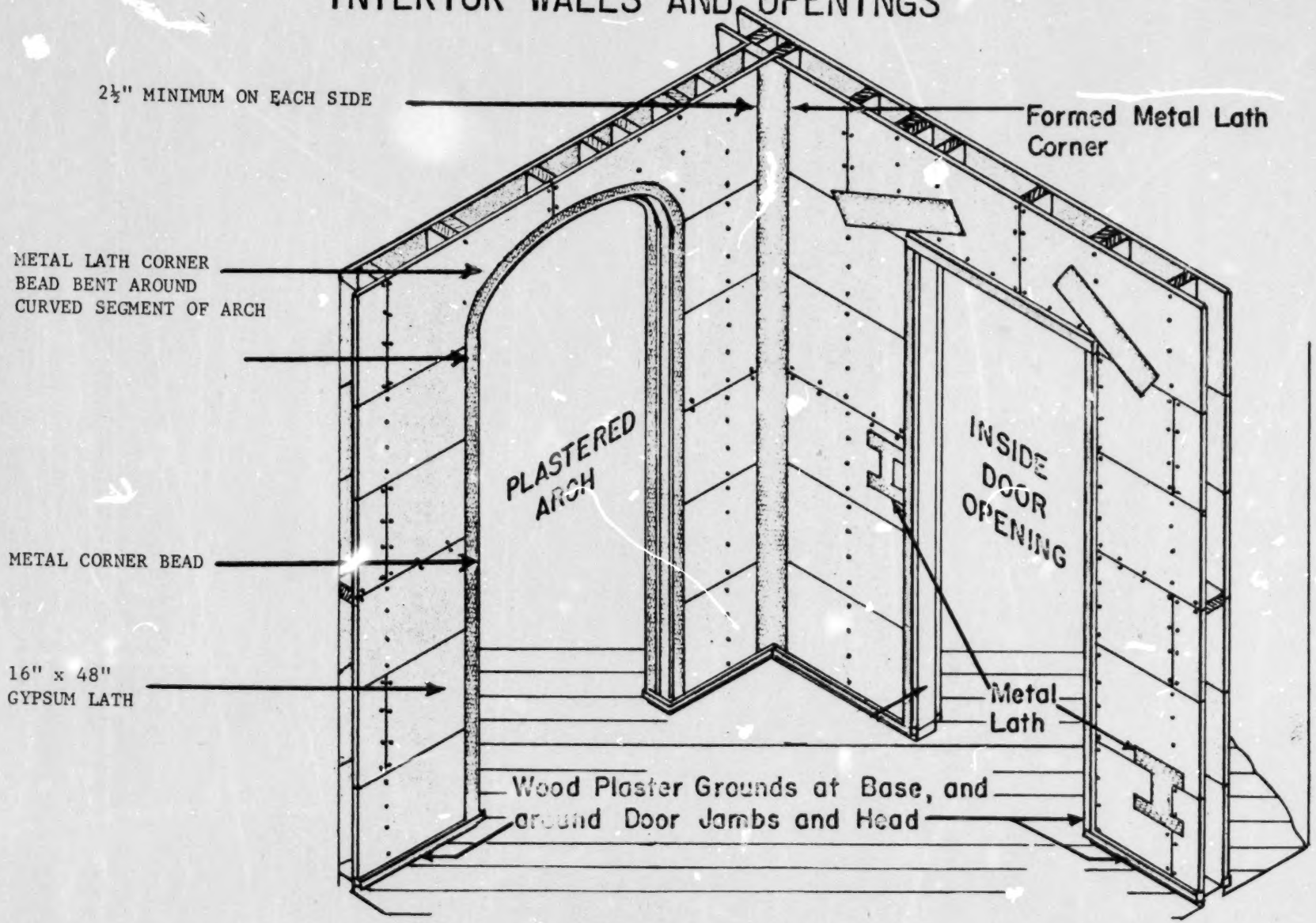

Gypsum Lath and Plaster
Housed-out Wall Stringer
Stock Tread and Riser
Plaster Soffit, if Required
2" Rough Carriage set away from Wall Framing to permit placing of Wall Stringer


Housed-out Finish Wall Stringer
1" Stair Nosing
1¼" Finish Tread
⅞" Finish Riser
Scotia
Finish Floor
R
T
2" Rough Carriage
Glued Block
Sub Flooring

INFORMATION SHEET



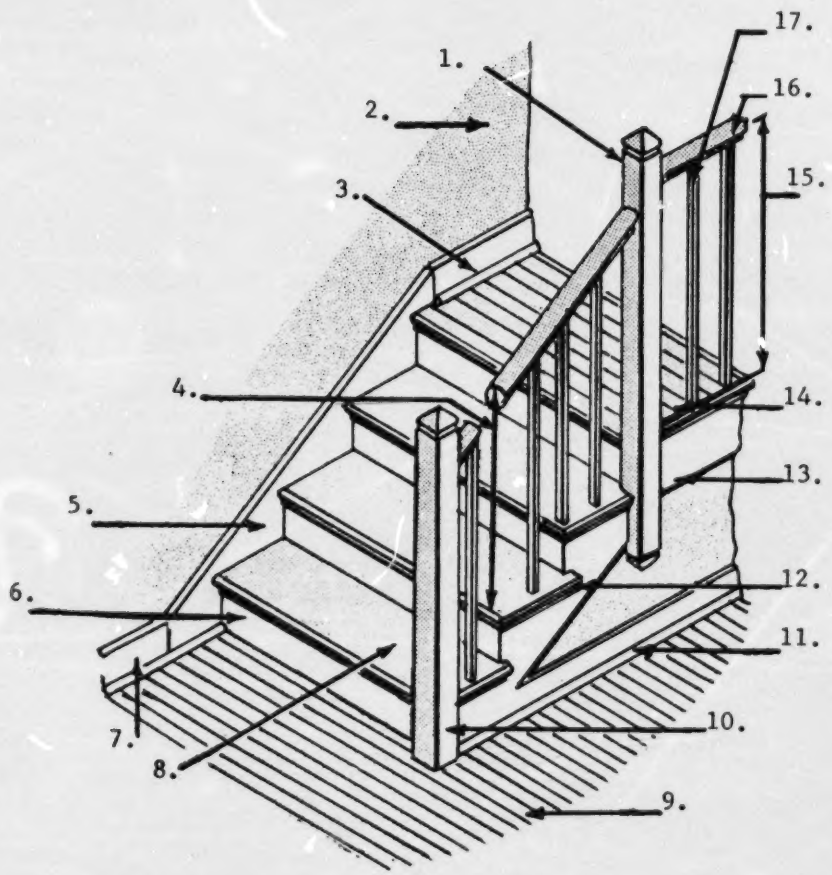
THE APPLICATION OF METAL LATH AND PLASTER GROUNDS INTERIOR WALLS AND OPENINGS


2½" MINIMUM ON EACH SIDE
Formed Metal Lath Corner
METAL LATH CORNER BEAD BENT AROUND CURVED SEGMENT OF ARCH
PLASTERED ARCH
INSIDE DOOR OPENING
METAL CORNER BEAD
16" x 48" GYPSUM LATH
Metal Lath
Wood Plaster Grounds at Base, and around Door Jambs and Head

ASSIGNMENT SHEET

NAME STAIR PARTS

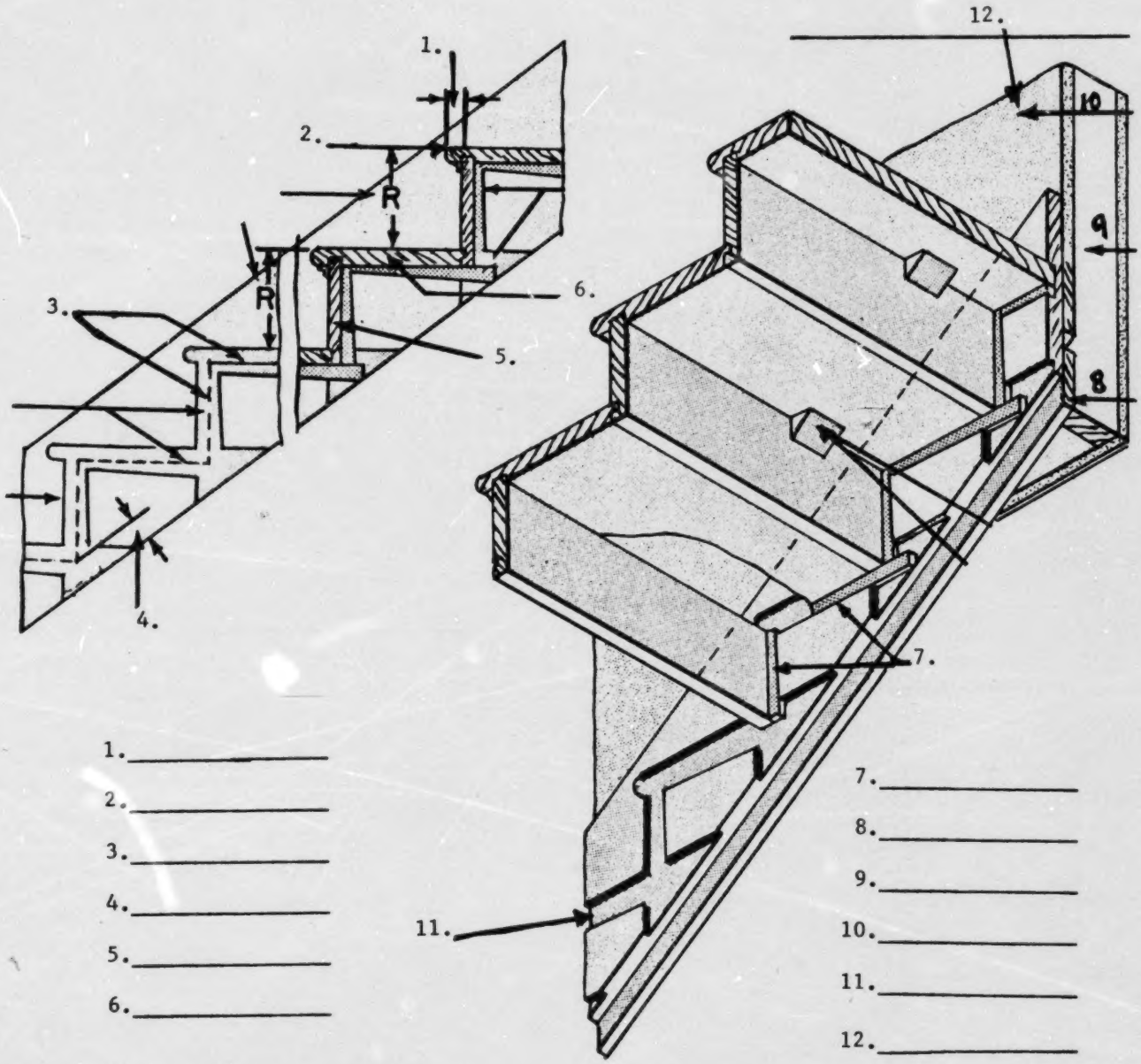
PLACE THE NAME OF THE STAIR PART IN THE COLUMN AT THE RIGHT THAT CORRESPONDS WITH THE NUMBERED PART.



1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____

ASSIGNMENT SHEET

NAME PARTS OF STAIRS AND WALLS

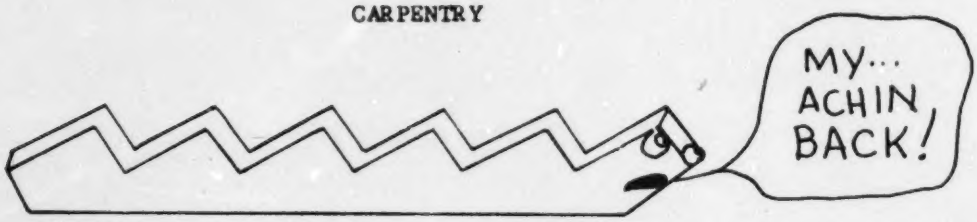


1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

7. _____
8. _____
9. _____
10. _____
11. _____
12. _____

JOB SHEET

CARPENTRY



GENERAL INFORMATION

STAIR CARRIAGES (Horses) should be laid out on 2 x 10 or wider plank so as to have at least 4" of solid stock between the cutout section (for risers and treads) and the edge of the plank. Accuracy is of major importance insecuring a satisfactory stairway.

SPECIAL SAFETY PRECAUTIONS

1. When making a partial cut with a skilsaw do not remove saw from wood until blade stops revolving.

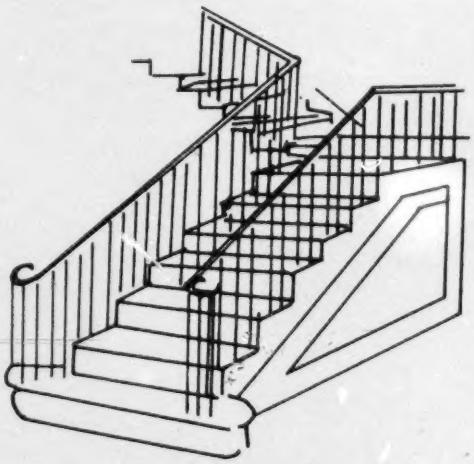
2. Wear safety goggles while sawing with the skilsaw.

TOOLS AND EQUIPMENT

1. Framing square
2. Tape
3. 6' rule
4. Dividers
5. Pencil
6. Skilsaw
7. 8 pt. handsaw
8. Stair rod
9. Saw horses
10. Safety goggles

PROCEDURE

1. Determine total rise.
2. Determine tread rise.
3. Determine tread run.
4. Select carriage stock.
5. Layout first riser and bottom level cut.
6. Step-off balance of steps.
7. Layout drop of carriage.
8. Cut carriage with skilsaw.
9. Finish cuts with handsaw.



QUESTIONS

1. What do we mean by the 17 rule of tread rise and tread run?

2. Upon what does the pitch of a stairway depend?

3. What degree of pitch is recommended for a comfortable stairway?

OPERATION SHEET

Instructional Unit:
Procedure in assembling a framed opening

References:
Wagner, Modern Carpentry
page 124

Tools, equipment, and materials:
Folding rule
Hammer
Framing square
Portable power saw
16d common nails
2" x 10" joists

Instructional Steps:
a. Lay out opening
b. Measure trimmer length
c. Measure length of header and tail joist
d. Cut material

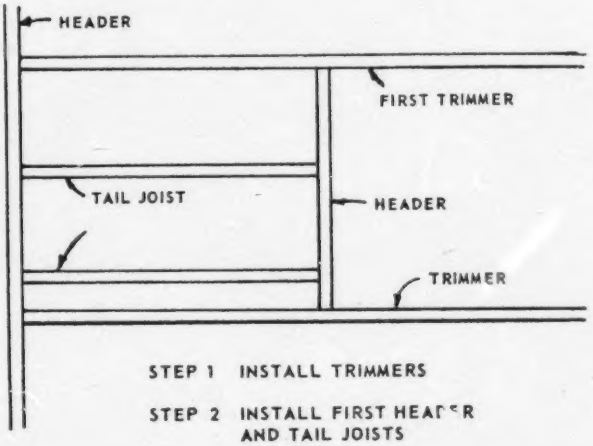
Step 1
a. Nail trimmer in place
b. Use 16d common nails

Step 2
a. Install first tail joist
b. Use 16d common nails

Step 3
a. Install second header
b. 16d common nail

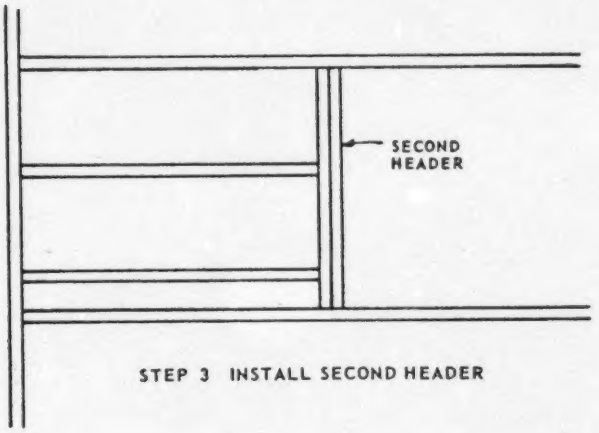
Step 4
a. Nail second trimmer in place

Note: Work safely, carefully, and with accuracy.

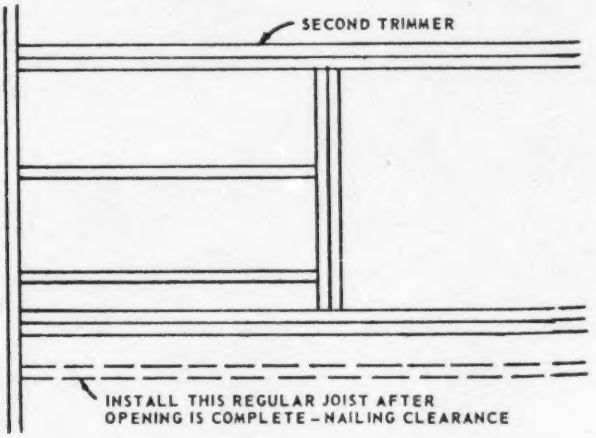


STEP 1 INSTALL TRIMMERS

STEP 2 INSTALL FIRST HEADER AND TAIL JOISTS



STEP 3 INSTALL SECOND HEADER

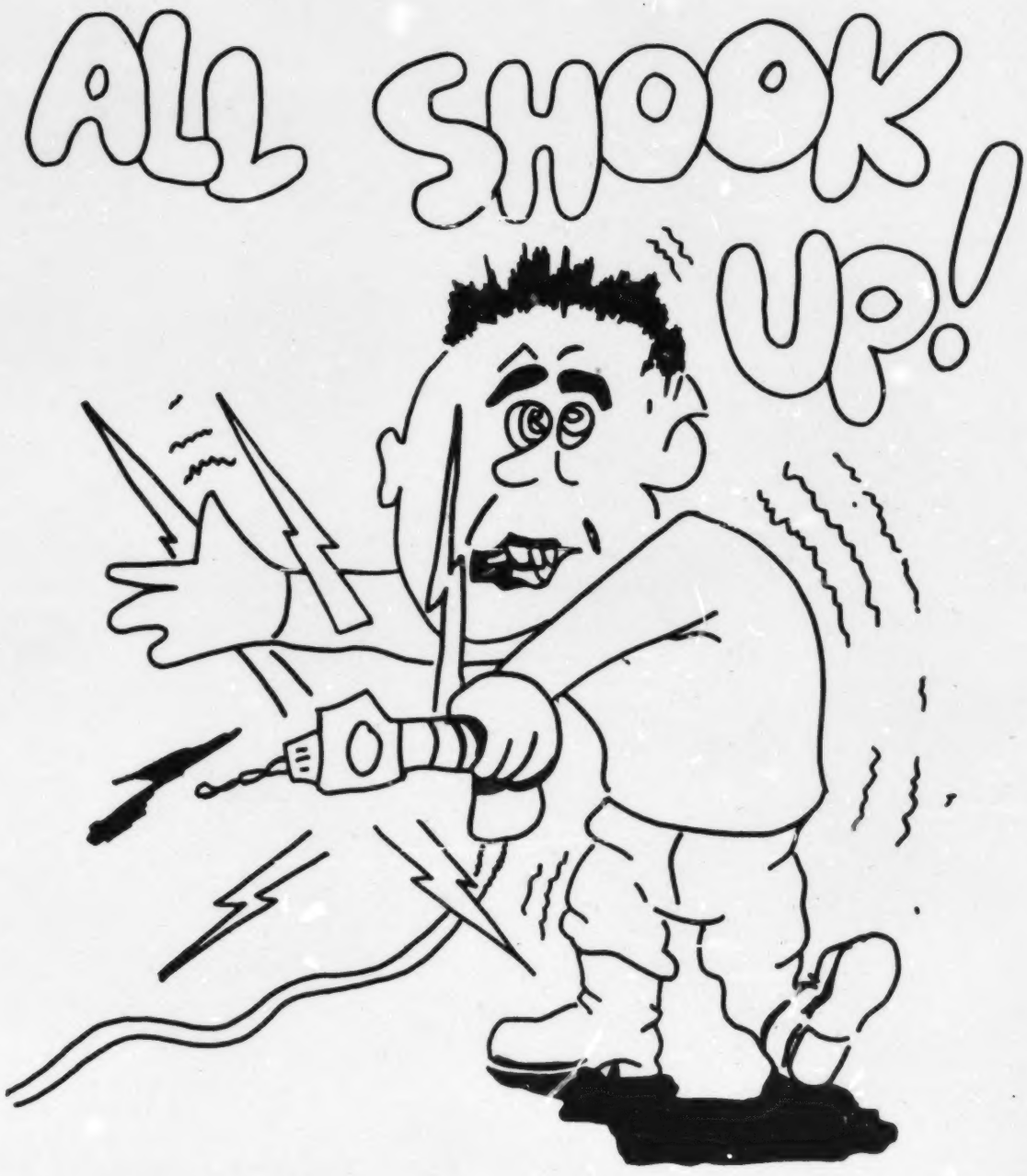


STEP 4 INSTALL SECOND TRIMMER JOIST

YOU MAY EAT WITH FALSE TEETH.
BUT, YOU CAN'T SEE WITH A GLASS EYE!

WEAR GOGGLES WHEN NEEDED!

NO
HORSE
PLAY
HORSE RACE
$200 3rd race
IN
SHOP!



GROUND IT, BEFORE IT GROUNDS YOU!!

IF YOU LIKE HORSEPLAY
GET A
HOBBY HORSE

124

REFERENCES FOR INSTRUCTIONAL AIDS (continued)

J- Wall Charts

Stanley Tools
Division of the State Works
Educational Department
New Britian, Connecticut

1. 1 Foot Rule
2. Measuring Rules
3. Measuring and Marking Tools
4. Common Cuts in Wood
5. Common Wood Joints
6. Common Wood Joints
7. Try Square
8. Marking Gauge
9. Plane
10. How to Grind Plane Iron
11. How to Whet Plane Iron
12. Assembling Double Plane Iron
13. Setting Plane Iron
14. How to Use Plane Iron
15. Block Plane Iron
16. Spoke Shaves
17. Horizontal Chiseling
18. Vertical Chiseling
19. How to Use Hand Saws
20. Nail Hammer
21. Screwdriver
22. Spiral Ratchet
23. How to Use Boring Tools
24. Hand Drill
25. Automatic Drill
26. Bit Brace
27. Doweling Jig
28. Sharpening Hand Scraper
29. Sharpening Cabinet Scraper
30. T-Level
31. Butt Gauge
32. Soldering Iron
33. Ball Pein Hammer
34. Straight and Cross Pein
35. Flat Cold Chisel
36. Cape, Round Nose, and Diamond Point Chisels
37. Riveting Hammer
38. Setting Hammer

APPENDIX C

Suggested Tool List

TOOL INVENTORY

Suggested minimum for Class of 20 Students

	Item	Number
1.	Bits - Auger - 1/4" to 1"	2 sets
2.	Bits - Masonry 1/4" through 3/4"	4
3.	Bits - Drill 1/16" to 1/2" in 64ths.	1 set
4.	Bits - Masonry 1/4" through 3/4"	1 set
5.	Brace	2
6.	Brush, File	1
7.	Chalk Box	2
8.	Chisel, Cold	1 set
9.	Chisel, Wood 1/4", 3/8", 1/2", 3/4", 1", 1 1/4", 1 1/2"	4 sets
10.	Clamp "C" 8"	4
11.	Dividers - 6"	2
12.	Dividers - 12"	2
13.	Door and Jam Butt Templet	2
14.	Drill, Electric 3/8"	1
15.	Drill, Electric 1/2"	1
16.	Drills, Star 1/4" through 3/4"	1 set
17.	Drill, Yankee	2
18.	Files, Variety	18
19.	Gauge, Butt	6
20.	Gauge, Wood-Marking	2
21.	Hammer, 16 oz.	10
22.	Hammer, 13 oz.	10
23.	Hammer, 3 lb.	1

127

TOOL INVENTORY (continued)

Item	Number
24. Hammer, Sledge	2
25. Hatchet, Hand	2
26. Level, Carpenters -24", 30", 48"	2 each
27. Level, Transit	1
28. Line, Chalk (cotton)	2
29. Mitre Box	2
30. Nail Claws	2
31. Plane, Power	1
32. Plane, Block	2
33. Plane, Smooth, 9"	2
34. Plane, Jack, 14"	2
35. Plane, Jointer, 18" or 22"	1
36. Pliers, Side	2
37. Pincers, Carpenters	2
38. Router	2
39. Rod and Target	1
40. Rule, 6 ft. Extension	24
41. Saw, 8pt. Crosscut	8
42. Saw, 10pt. Crosscut	8
43. Saw, 12pt. Crosscut	3
44. Saw, Compass	2
45. Saw, Coping	2
46. Saw, Hack	1

TOOL INVENTORY (continued)

Item	Number
47. Saw, Mitre, 26"	2
48. Saw, Skill	1
49. Saw, Reciprocating, (Heavy duty)	1
50. Saw, Sabre	1
51. Sash - Doorholder	2
52. Set - Saw	1
53. Set - Nail	12
54. Screwdriver - Phillips - 2 pt.	6
55. Screwdriver - Phillips - 1pt.	6
56. Screwdriver - 4" blade	6
57. Screwdriver - 6" blade	6
58. Screwdriver - 8" blade	6
59. Screwdriver - Yankee	1
60. Snips, Tin	2
61. Square, Combination	6
62. Square, Framing	20
63. Square, Sliding T Bevel	6
64. Square, Try, 12"	6
65. Square, Try 6"	6
66. Tape - 100 ft. Steel	2
67. Tape - 50 ft. Steel	1
68. Tripod, Transit	1
69. Vise, Saw	1

TOOL INVENTORY (continued)

Item	Number
70. Wrecking Bar - 18"	4
71. Wrecking Bar - 24"	4
72. Wrench - Box and open end, 3/8" to 1"	1 set
73. Wrench - Adjustable 10" and 12"	2 each